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Patrick S. Fraser M.D.

THE

HISTORY

OF THE

CONTAGIOUS CHOLERA;

WITH

REMARKS

ON ITS

CHARACTER AND TREATMENT

IN

ENGLAND.

By JAMES KENNEDY,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON.

THIRD EDITION.

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1832.

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TO

THE RIGHT HONOURABLE

JOHN GEORGE, LORD DURHAM,

LORD PRIVY SEAL,

HIS MAJESTY'S AMBASSADOR EXTRAORDINARY
AT THE COURT OF PETERSBURG,

&c. &c. &c.

My Lord,

While it belongs to the Nation to do justice to Your Lordship's public character and distinguished abilities, permit me, in inscribing this Work to Your Lordship, to bear testimony to that private worth which seeks its only triumph in conferring unostentatious acts of kindness.

I have the honour to be,

My Lord,

Your Lordship's greatly obliged,

Very faithful,

And very humble servant,

JAMES KENNEDY.

London, July 25th, 1832.

PREFACE

TO

THE THIRD EDITION.

Since the publication of the First Edition of this work, the Cholera has extended, on one hand, to Egypt; and on the other, to Great Britain, Ireland, France, Belgium, Holland, and America. Wherever the pestilence has appeared, in point of time, to have been communicated from a Continent to an Island, or from an Island to a Continent, the same strong evidence in favour of contagion is still developed, as marked its early progress through the Indian Ocean, and elsewhere. In England, it first commenced at a port-town which had maintained

frequent intercourse with the diseased ports of the Baltic; and in British America, at Quebec, a city that had maintained frequent intercourse with the diseased ports of the Three Kingdoms. In the present edition, it will be my object to give the results of my observations on the character and treatment of the Cholera in England.

LONDON, *July*, 1832.

PREFACE
TO THE FIRST EDITION.

As the chief aim of Medicine is to discover a remedy for the ills of which it treats, I have made the curative process the object of my particular attention in the present work. This was rendered the more imperative, here, in consequence of the advance of the cholera to Western Europe, and the doubts which exist among medical men, who have not been in India, as to the proper method of cure. While speaking of the medical treatment,

I have restricted myself to the elucidation of what I conceive to be leading facts and principles, in order that the most important points of practice might be fully understood, and easily remembered. With this assistance, however, the professional reader will be enabled to select a great variety of detail information from other parts of the volume to be presently described.

The large majority of the facts are taken from the Reports on Cholera, which were compiled in India by order of the East India Company. For the opportunity of laying them before the public, I am indebted to the liberality of the Honourable Court of Directors, which has ever shewn an earnest desire to promote the interests of science. In making abstracts from a part of these valuable reports, my object was of a general character, namely, to introduce short descriptions of cholera, and a variety of opinions from various authors—under the impression, that a more comprehensive knowledge would be conveyed in this

way, of the peculiarities of the disease, than could possibly be afforded in the uniformity which usually pervades the description of an individual.

That the contents may be accessible to the general reader, few technicalities have been introduced, and, with a similar object, some pages of explanatory matter have been added, which will require the indulgence of the professional critic. It is right, however, to observe, that I have no personal dislike to technicalities: the terms of common language are not at all times sufficiently restricted in their meaning for scientific use, and, occasionally, they cannot afford even a vague substitute for a technical expression. Medical technicalities may be used improperly, or multiplied to excess; but persons who raise an indiscriminate clamour against them, are either ignorant of the spirit of science, or actuated by sinister motives. Technicalities are here frequently dispensed with, because it is of the utmost importance

that the public should know to what extent the cure of cholera is practicable, and in how far it may depend upon their own exertions, and the exertions of the profession. If the public are not made aware of the danger of delay in this rapid disease, and reconciled to an effective system of treatment, few will be the number of the recoveries in the event of its arrival amongst us.

Two Maps are given, illustrative of the geographical progress of cholera; and to render them the clearest and most correct hitherto published, neither time nor attention has been spared.

The variety of Indian cholera under consideration has had several names assigned to it, as the "Epidemic Cholera," the "Spasmodic Cholera," the "Epidemic Spasmodic Cholera," "Cholera Asphyxia," the "Malignant Cholera," &c. It matters little what name is bestowed upon a disease, provided the name leads to a knowledge of its identity; none of the preceding, however, seems suffi-

ciently expressive for that purpose. In India, the *species* of cholera to which this variety belongs, had existed from the earliest ages, and, occasionally, had prevailed to a great extent, and in an exceedingly virulent form, even previous to the year 1817; during these periods, some, or all of the above names, might very well apply; but, in 1817, the disease assumed a contagious property, which there is no evidence to prove it ever before possessed; and a name was then wanting to distinguish the new variety. Writers, convinced of its propriety, have abstained from using the title "Contagious Cholera," in deference to the opposition of the Non-contagionists. With every respect for the ability displayed in this opposition, I cannot pursue a similar course. My defence must rest on the facts adduced towards the end of the volume in favour of contagion, and the common practice, in physical philosophy, of adopting the hypothesis which best explains the phenomena. To avoid expressing an opinion, the appellation,

"Malignant Cholera," will appear once or twice, not, of course, as characterizing the violence of the disease in individual cases, but the wide-spreading destruction which has peculiarly marked its progress.

Opinions of an abstract tendency, that might interfere with the practical utility of the volume, have been specially avoided. On this account, the primary origin of the Contagious Cholera in Bengal is attributed to the *obvious* circumstances under which it appeared. Speculations to ascertain the nature of the peculiar and essential change that the climate, soil, and constitution of the inhabitants, or that any of these, underwent, could serve no useful purpose. Human knowledge is in this respect extremely limited; we know that one species of tree will bear apples, another peaches, but we cannot tell *why* their fruits are different. The Malignant Cholera is a production of Bengal, and is indigenously unknown in Lower Egypt—countries that have many properties in common.

Since the body of the work went to press, the Board of Health, established by His Majesty's Government, has published a pamphlet,* containing papers descriptive of the cholera in Russia. The symptoms of the disease, as there detailed, appear to correspond pretty accurately with those of the cholera in India; but the manner in which it is divided into stages does not agree with that adopted here, and it will therefore require a few observations to obviate confusion.

In the report of Drs. Russell and Barry, the cholera is divided into two stages. The first of these is called the *cold* stage; the second, the *hot* stage. In my arrangement, on the contrary, the *cold* period—or, as I call it, "acute cholera"—is *not* comprised in one stage: it is divided into two types, and several stages, for the purpose of medical treatment. To the hot, or fever-period—and, indeed, to all the morbid sequelæ of acute

* Papers relative to the disease called "Cholera Spasmodica," published by authority of the Privy Council, 1831.

cholera—I would give the name of " chronic cholera."

Acute cholera, it appears, has been much more frequently followed by common febrile symptoms in Russia, than in India; and these symptoms have been very severe. To account for this, we may suggest one of two suppositions — either that the disease has become more intractable in cold climates— or, that the early stages have not been treated as effectively in Russia as in India.

I have seen no detailed account of the practice pursued in Russia. In the circular of the Board of Health, the remedial measures are recommended on the strength of the reputation which they acquired in India. The Board has been very general in its advice, restricting itself almost uniformly to a catalogue of symptoms and remedies. In one or two instances, however, the Board has departed from this general reserve; and, as I conceive that it has here fallen into an error, I shall quote the objectionable passage.

Speaking of the rapid form of acute cholera, the Board observes—"In cases of this severity, "the vomiting and purging characteristic of "the disease do not commonly take place so "early as in milder attacks, but seem to be "delayed until the almost-overpowered func- "tions of the body make a slight effort at re- "action. It is worthy of remark, that, unless "death takes place, in these extreme cases, "within a few hours, some effort of the animal "power is made to rally the constitution; and "this point is insisted upon here, because it "will direct the mind of practitioners to *the* "*particular moment when bleeding*, and cer- "tain other parts of practice, recommended "in the Indian reports, can be enforced in "this country with probable success."—Now, if this recommendation of the Board of Health should be observed in England, in case of the arrival of cholera, I cannot withhold the expression of my conviction (judging from the practice in India), that it will lead to the loss of numerous lives that might

have been preserved under judicious treatment.* Here, blood-letting is advised to *wait* upon reaction; and, in the majority of violent cases thus treated, reaction will never occur. No—blood-letting should be performed the instant of the attack, or in as few minutes after as possible; and, if blood can be freely procured, the blood-letting will be the efficient remedy in *establishing* reaction. So great are the advantages of early blood-letting, carried to a greater or less extent, according to the age and constitution of the patient, and the severity of the symptoms, that, in every severe case of cholera seen by the practitioner at the commencement of the disease, it should be resorted to. A slight delay, even in the protracted type, may render this remedy unavailable. After the cramps are fully formed (as in the second

* The medical gentlemen composing the Board of Health are said to have never had practical experience of cholera; this statement, therefore, cannot affect their medical judgment in other matters.

division of the symptoms of the first stage, recorded at page 174), it will rarely happen that blood can be obtained in sufficient quantity to prove serviceable; and when it cannot be obtained in quantity, its *partial* abstraction seems often productive of an injurious effect. The public should be warned of the universality of blood-letting at the *onset*, and plain rules should be given for its popular use—as circumstances may occur, in which the operation might have been performed through the instrumentality of "bleeders," and others, before the arrival of the regular practitioner. *Dry* heat is a remedy that the public should always apply, until such times as they can receive proper advice; but as the application of moist heat requires considerable medical judgment, it can scarcely ever be trusted out of professional control.

J. K.

London, Nov. 1831.

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THE HISTORY

OF THE

CONTAGIOUS CHOLERA.

SECTION I.

Early Impressions on Entering Bengal.—Climate, &c.—Origin of the Malignant Variety of Cholera, in the year 1817, ascribed to the Climatic Vicissitudes and Peculiarities of Bengal.—Propagation of the Disease through the Upper Provinces of Hindostan ascribed to Contagion.—Progress of the Contagious Cholera during the first twelve months of its Course.

The stranger who visits Bengal, alive to the "splendour of the East," discovers little to gratify his expectation, in the first approaches leading from the sea towards Calcutta. Weighing anchor at day-break, he leaves the treacherous "Sand Heads" behind him, and enters the estuary of the river Hooghly, a broad and deep branch of the mighty Ganges. To the right, lies Saugor Island, the nearest point of the coast. To the left, dimly emerging from the waters, lies Kedgeree. The sun is now gathering strength, and the malarious vapours are seen coiling themselves up from the

surface of the land, which presents the unbroken aspect of an endless swamp, covered with low, black, impenetrable jungle. As the "City of Palaces" is yet distant one hundred miles, there is ample room for improvement. The ship, under the favouring influence of wind and tide, flies at the rate of fourteen miles an hour,* and the eye is constantly greeted by new objects of wonder. The jungle is gradually giving way to shrubs of healthy stature and complexion. These, again, are obliged to yield to trees of subordinate dignity; while, another hour over, and the voyagers are introduced to the aristocracy of the woods. Groves of majestic timber, of varied shape and hue, line the banks, or cluster here and there, revealing in the interspaces the outwork of civilization, which, to a traveller weary of the sea, is the most delightful prospect in nature. The patient Ryots (Hindoo farmers) are slowly traversing their rice-fields. In the distance stands a native village; the conical huts, each constructed in the form of a hay-stack, give to the whole the strong resem-

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* Every person is aware of the rapid manner in which the tide flows up the Ganges; but this description is meant to apply more particularly to the circumstances under which the author entered Bengal.

blance of an English farm-yard. The aspect of the country, however, shews no "pinnacle of hope;" it is still a low, moist, interminable flat.

Having reached Diamond Harbour, scarcely five-and-thirty miles from Calcutta, the current of observation flows in a new channel. The pilot points to this as the place where thousands of our countrymen have been sacrificed to marsh fever. The Company's ships, in delivering their cargoes here, send ashore many a gallant tar never to return. The malignant cholera, also, soon after its ravages were begun, travelled through the shipping at the anchorage, and carried off many victims. These remarks, in passing, fill the heart of the stranger with a tide of mournful emotions, and evil anticipations—his home, and the expectant faces of parents, brothers, and sisters, on the one hand; his own untimely death, and their unutterable sorrow, on the other.

New impressions quickly swallow up the old. Calcutta is in sight, and the villas of the English residents in the vicinity, sunning their Grecian faces in the planted lawns, seem to realize the visions of eastern pride and luxury. These mansions, built after the ancient architecture, and surrounded with luxuriant vegetation, have a highly picturesque appearance.

The impression which the English portion of Calcutta is calculated to make will be much diminished by a previous acquaintance with "Garden Reach," the line of sub-urban villas, which is necessarily passed in sailing up the river. The houses in the city are built in the same fashion as those in the Reach. They are in general spacious, and, for ornament or use, are plentifully furnished with pillars and verandahs. But in this part of the globe, Europeans have reared few objects of curiosity worthy of special remark. A walk through Government House, and Fort William, with an evening drive round the "Course," (an open park, which encircles the Fort,) comprehend nearly all the sights of which the modern capital of India can boast.

The excitement of novelty subsides in a few days, and the stranger discovers that a building with a splendid exterior can ill supply the absence of comfort within. His European tastes and habits are outraged by every thing, in the economy of an Indian dwelling. The huge apartments are uncarpeted, and scantily furnished, which, in addition to white-washed walls and ceilings, diffuse an air of desertedness around their unaccustomed inmate, who will not admit that coolness, and the partial exclusion of insects

and reptiles, compensate for the want of the domestic ornaments.

It might be expected, that the effect of the ungratifying prospect within doors, would be forgotten in the beauty and advantages of the external world. Here, also, inexperience meets many disappointments. The fields, though abounding in the rarest productions of the vegetable kingdom, are not to be entered at all times with impunity. To wander with Nature carelessly, as of old, might lead to an attack of jungle-fever, or to a "sun-stroke." The sojourner in this unhealthy region discovers, sooner or later, that the source of his best enjoyment must ultimately repose on the hope of returning in independent circumstances to his native land; and that the surest way of attaining the object of his wishes is to make himself acquainted with the general character of the Indian soil and climate, in order to avoid, as far as possible, the physical causes of disease.

The surface of Bengal is wonderfully uniform, being throughout almost a perfect level. The dreary monotony is scarcely relieved by the rudiments of a solitary hill, though the length of the province has been estimated at 350 miles, and the average breadth at 300. The soil, in general,

is a rich alluvion, which, from the north-western boundaries of the province, is watered by the Ganges. The tributary branches, also, of that river, and their innumerable subsidiaries, intersect the country in every direction. During the rains, no district is altogether destitute of internal navigation; and even in the dryest weather, there is scarcely any part distant a day's journey from a navigable stream. In most places, the natural inlets, or the artificial lakes and water-courses, admit of boats passing to the door of the peasant.

The wet surface of Bengal might lead to the supposition that springs of good water would be found at a moderate depth. But this is not corroborated by the following experiment:— In sinking a well, near the banks of the Hooghly, in the vicinity of Calcutta, the first appearance of damp was at the depth of 71 feet, and below 76 feet the soil was dry, as near the surface. At the depth of 140 feet, which is nearly the level of the sea, no springs of fresh water could be detected.

As a proper supply of water is the great object of the Bengal farmer, numerous embankments are raised, to prevent its unequal distribution over the face of the country. In this way the rain is retained on extensive plains, which (on

account of their gentle declination towards the coast) would otherwise be completely parched, while the lower districts would be drowned in excess. For domestic purposes, as well as irrigation, a multitude of "tanks" (ponds) have been excavated, and surrounded with elevated banks, to collect and preserve the rain. These abound everywhere, and, apart from their utility, are productive of many evils. In the opinion of a rich, religious Native, one of the best acts he can perform is the formation of a tank: consequently, new reservoirs are multiplied beyond what necessity requires; while the old, as there is no spiritual reward to be expected for repairing them, are permitted to decay. They soon become overgrown with aquatic plants, and then form the cradle of noxious exhalations and disease.

In the southern parts of Bengal, the prevailing winds are North and South. The northerly and southerly winds blow alternately, during unequal portions of the year, over that quarter of the province which approaches the ocean. The seasons conform nearly with those changes of the prevailing winds, and are usually distinguished by the terms Hot, Rainy, and Cold.

The HOT SEASON commences with the approach of March, (the thermometer ranging between 73°

and 86°,) and the heat gradually increases till the latter end of May, when the weather has become exceedingly sultry and oppressive. The thermometer now fluctuates between 81° and 93°, in the shade, and the nights are calm, close, and suffocating. During the hot season, the wind blows steadily from the south, with the exception of an occasional storm, of short duration, from the north-west. These storms, called in India, "North-westers," are welcome visitors, as they serve to cool the burning air, and recruit the exhausted vigour of animal and vegetable life. The phenomena which precede and accompany a north-wester are very remarkable. Towards the evening of the day on which the storm is to occur, the southerly wind, which had been previously continued and strong, dies gradually away into a dead calm. The clouds in the north-west part of the heavens have collected into a dense, lowering mass, like a mountain. Vivid lightning, and approaching thunder-peals, announce the advent of the hurricane, and it bursts instantaneously, with full force, darkening the air with clouds of dust. Then follow torrents of rain; and in an hour or two, the commotion is over, leaving the atmosphere cool and delightfully refreshing.

The RAINY SEASON sets in about the middle of June, and with it, to the relief of the parched inhabitants, the atmospheric temperature declines. The wind coming round to the east, the frequent occurrence of thunder in the evening, and the constant cloudy state of the sky, are the heralds of the approaching change. The rainy season continues during the four succeeding months. In the first two months, the fall is generally incessant and heavy, an interval of a few days in succession being very unusual; but in the latter two, the intervals are considerable, and often repeated. The rivers begin to swell with the setting-in of the rains, and in the third month the Ganges attains its highest point of elevation. By this time the low country is inundated throughout, and in the rice-fields the ears of the grain may be seen floating on the surface of the deluge. The habitations of the peasantry, built on artificial mounds, are raised beyond the common ascent of the waters; yet, in visiting the fields or neighbouring markets in their boats, the farmers generally carry their families with them, lest they should be submerged and drowned in their absence.

The COLD SEASON commences with November, and ends in February. It is the period of enjoy-

ment in India. The wind, now changed to the west and north, has rapidly swept away the dense masses of vapour that hitherto obscured the sky, leaving the atmosphere of a deep azure, without a cloud. The nights are also clear: the air feels cold, sharp, and bracing, and the decreasing temperature, by the middle of January, ranges as low as from 47° to 75° Fahrenheit. Even the cold season, however, has its peculiar evils. In the month of December, though the greater part of the day is clear, and the wind continues as before, towards evening a thin haze is observed to creep above the horizon, which, with the advance of night, is condensed into thick fogs. The fogs prevail during the remainder of the winter, rendering the mornings dark and disagreeable. No rain falls in the cold season; but vegetation thrives under the descent of copious dews. Throughout the year, the fluctuations of the barometer are exceedingly limited.

When the seasons observe the general course and period of succession just described, their influence on the constitution of the inhabitants is productive of several maladies which are considered in a great measure peculiar to these different divisions of the year. Thus the diseases chiefly dependent upon frequent transitions of

heat, cold, and moisture, as rheumatism, catarrh, intermittent fever, and diarrhœa, are the concomitants of the cold season. The scorching heats of summer are productive of bilious remittent fever, and this malady continues in the ascendant until August or September, when bilious dysentery becomes the prevailing distemper. Cholera and acute inflammation of the liver may occur in any month of the year; but they appear to be most frequent about the beginning of the rains.

In irregular seasons—and such will occasionally occur—the rains set in much earlier or later than is usual, forming what is called a *dry* or a *wet* year. Under these circumstances, the climatic affections are increased both in frequency and severity, and their characters will be determined by the nature of the atmospheric vicissitude. If the hot summer weather have been protracted, the enervated population suffer in an aggravated degree from the distempers common to hot seasons. If moisture prevail, the maladies of the rainy season may be anticipated in a more than ordinary abundance.

These are the evil effects succeeding *directly* to the influence of an irregular season; but there are others of still greater magnitude, which

spring *indirectly* from the same source. Irregular seasons, for instance, deteriorate the produce of the earth, and consequently the health of the inhabitants will be deteriorated by the use of the diseased grain, and the scarcity of food which necessarily follows a bad harvest. An extreme example of this was witnessed in the dreadful famine and its attendants, which, about the year 1769, carried off three millions and upwards of the people of Bengal. The falls of rain had been unfrequent and of short duration, so that every plant was parched and unproductive. The grain crop was almost a total failure; and as the two former crops had been scanty, in their hour of extremity the inhabitants had no resource. Rice soon attained ten times its usual price, and the miserable people were driven by the cravings of hunger to the woods, where they perished in thousands, after devouring the bark of trees and the remains of putrefying vegetables.

It is during the existence of these extraordinary calamities that mankind are most exposed to the inroads of pestilence. The scarcity and badness of the food, together with the deranged state of the atmosphere, conspire to debilitate and corrupt the animal system. Whole families

in a state of utter destitution, ultimately become, through bodily weakness, unable to leave their beds or hovels, and there they lie, surrounded by accumulating filth, until hunger or disease puts a period to their sufferings. It is not surprising to find, therefore, that many maladies, previously known only in a mild shape, should, in such a concentration of misery, become exceedingly virulent, or that some non-contagious distemper, occurring casually at the time, should suddenly assume a contagious form.

The majority of the severe contagious diseases which have from time to time afflicted Europe, were imported from the East. The small-pox was known for generations in China before it made its way to the West in the middle of the sixth century. For its origin, in the first instance, small-pox was most probably indebted to the crowded population of China, and the coincidence of famine, a distempered atmosphere, and, in short, to such circumstances as we have previously attempted to describe. In this way every age may be expected to modify the registered maladies, as it modifies the habits and genius of the inhabitants; and new diseases may be expected to arise, and old diseases to decline, as the natural consequence of

a change in the physical and moral condition of the people.

The close alliance existing between bad food, atmospheric vicissitudes, and the growth of contagious diseases, has been demonstrated in Bengal, even of late years. During the rainy season of 1815, the fall of rain was excessive, and what rendered it the more remarkable was, that the Ganges, the Soane and the Coossee rivers, burst their boundaries, and destroyed much agricultural property in the neighbouring districts. The cold season that followed was damp, unpleasant, and exceedingly cumbered with dense fogs. On the other hand, the hot season of 1816 was distinguished for drought and intense heat. Few north-westers occurred to temper the air, and those that did occur, were accompanied with little or no rain. Towards the end of May, the thermometer had risen to 98° in the shade, a very uncommon height in Bengal; and under the effects of this extreme temperature, many persons, European and Native, fell down dead in the streets.

The burning weather continued until interrupted, on the 14th June, by the commencement of the rains. During the remainder of June, and throughout July, the fall of rain was moderately free in Calcutta and its vicinity; but in the

month of August the showers became very scanty and rare, and the days and nights oppressively hot. In the western part of the province, the great drought that succeeded dried up the rivers, and apprehensions were entertained for the safety of the rice-crop. The 1st of September, notwithstanding, ushered in a most unexpected change The unwonted drought suddenly yielded to a deluge of rain, which continued unabated through the month, and gave rise to a deeper and more extensive inundation than had happened at any period within the recollection of the oldest inhabitant.

It was now that the morbid effects of a long train of anomalous weather became evident among the people. In regular seasons, the prevailing diseases would have been of an inflammatory nature; but at this time the human constitution was too much enfeebled by an unwholesome atmosphere to support high inflammatory action. Diseases of debility, therefore, prevailed. The only cases, falling under the notice of medical men, were low fevers, and other disorders of the typhoid character. But the most remarkable feature in the period to which we refer, was the appearance of "Malignant Sore Throat," a contagious

disease previously unknown,* unless by name, in this portion of the globe.

The year 1817 was marked with as singular deviations from the ordinary course of the seasons as those of the preceding year. Between these two annual periods a further resemblance is afforded in the fact, that while 1816 gave birth to the contagious disease called "Malignant Sore Throat," in 1817 originated the Contagious Cholera, which has since ravaged the Asiatic continent and a large portion of Northern Europe.

February, 1817, instead of being dry and cold, like its general character as a part of winter, assumed the appearance of an autumnal month. It began to rain on the first day, and heavy showers were repeated every third or fourth day, to the beginning of March. During March, also, much rain fell, and, in addition, there was a constant alternation of cloudy and clear weather, the wind blowing with varied strength, steadily from the south. On the 21st a very violent thunderstorm was experienced, followed by hail and torrents of rain, which destroyed the blossoms of all the mangoe and other trees then in bloom, and

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* Bengal Report.

severely injured the spring crops of grain and the new-sown indigo lands. The thermometer ranging from 68 to 82 degrees, the air felt cool, and somewhat disagreeable to a person long resident in the country; but the inhabitants, European and Native, were in better than ordinary health. Among the former, chronic dysentery and rheumatism were the prevailing complaints. By the 30th of the month, however, an European soldier, belonging to his Majesty's 59th regiment, then stationed in garrison at Fort William, was attacked by cholera, and in spite of every remedy, died in thirty-six hours.

At this time the cholera did not extend beyond the insulated case just noticed, and there was little to be remarked either in the weather or the health of the population, until the 25th of May, when the rains commenced, which was fifteen or twenty days earlier than usual. The rain poured down in streams, almost incessantly, during June and July. The season was now characterized as extremely wet; the river was quite full, and the country nearly under water. The clouded atmosphere generally felt cool and pleasant, but occasionally rather close and sultry. Thermometer, 80 to 87 degrees. The existing diseases were still limited in extent: they had increased, how-

ever, in severity, and required active treatment. To fever, inflammation of the liver, and flux, acute rheumatism was now added.

The irregularity of the weather was not confined to the neighbourhood of Calcutta. In Jessore, Backergunge, Nuddeea, and every other part of the Gangetic Delta, the descent of heavy rain had been long and uninterrupted, and nearly the whole country, especially in the lower division of the province, was one sheet of water before the middle of August. Lakes and tanks, that in former seasons had remained nearly dry for a considerable time, were now filled to overflowing, and remained so for a comparatively long period. The measure of the rain that had descended was estimated at 120 inches, which is more by one-third than the quantity common to Bengal.

The sketch of the seasons immediately preceding the origin of the Contagious Cholera, will qualify us to enter on the subject with stronger hopes of being able to remove the obscurity in which it has been involved. To the same end, however, the reader should bear in mind that cholera, in a comparatively mild and non-contagious form, had been known for centuries, during the hot and rainy seasons, in the several districts of Bengal to which we have alluded. The occur-

rence of these non-contagious cases, in 1817 and succeeding years, was often confounded with that of the malignant kind, a mistake which led medical men to make statements apparently the most contradictory, although in an enlarged view of the matter perfectly reconcileable.

It appears that during and previous to the month of August, a pretty severe type of cholera broke out among the natives of Bengal and its neighbourhood, at or about the same time in different parts of the country, and in places where there had been no immediate inter-communication. This shews to conviction, that the state of the atmosphere, and the bodily condition of the native population in general, were circumstances sufficient of themselves to change the character of cholera; and that the virulent variety of the disease is not to be referred to any known or unknown cause, operating only in a particular locality of the province.

But when a malady originates in the way just described, its intensity is greatly modified by local circumstances. In a village supplied with running water, and surrounded by open grounds, which are favourable to free ventilation, the type will be less dangerous than in a town crowded with inhabitants, hemmed in by jungle, and exposed

to the exhalations of stagnant water. The type prevalent in the village, indeed, may be decidedly non-contagious, while that in the town—the disease being the same in kind, but different in degree—may assume the most virulent and contagious form.

Of the latter character, and distinguished by its intense malignity from all other varieties then prevalent, or previously known, was that form of Indian cholera which commenced its ravages in Jessore (a town distant sixty-two miles from Calcutta), during the month of August, 1817. Jessore is a crowded, dirty, ill-ventilated place, surrounded by a thick jungle, and exposed, during the rains, to the effluvia of an immense quantity of stagnant water. The district, of which it is the capital, in its southern quarter, is composed of the "Sunderbunds," a name given to numerous, low, marshy islands, contained in the Delta of the Ganges, and formed by the different channels through which that river travels to the ocean. The Sunderbunds are overgrown with wood, and inhabited only by tigers, reptiles, and similar denizens of the wilderness. The 28th of August, it was reported to the government that a malignant species of cholera had appeared in the populous town of Jessore, and that it was attacking all

classes of the natives indiscriminately, and cutting off from twenty to thirty persons daily. "The inhabitants," says the Report, "astonished and terrified at the unaccountable and very destructive inroads of the pestilence, are flying in crowds to the country, as the only means of escaping impending death. So unforeseen and unparalleled was the attack, that the functionaries, in extreme consternation, closed the Civil Courts of the District, and business of every description was abandoned for a time." Even at the beginning the disease seems to have exerted a very destructive power. In the short space of a few weeks 10,000 of the inhabitants perished in the single district of Jessore.

Many cases of cholera had occurred in Calcutta among the native population as early as the middle of August, but they appear to have been comparatively moderate, and of the non-contagious type. It was near the end of the month before the malignant disease began to spread, and the opinion obtained at the time that it had been imported from Jessore. That this opinion was unfounded, some medical men have since endeavoured to shew. The question raised, however, is of little interest; for in Jessore and in Calcutta, the condition of the people and of the atmosphere

must have been very similar; and the probability follows, that, sooner or later, a similar species of disease would have been generated in both, though no intercourse had existed between them.

The pestilence committed great havoc among the natives during the first days of September; but the Europeans were not attacked until the 5th of the month. Why the disease should reach the Europeans then, and not before, cannot be explained on any meteorological observation made at the time. The fluctuations of the barometer and thermometer were exceedingly small, and the other atmospheric phenomena were regular.

An official notification of the existence of the malignant cholera in Calcutta was forwarded the 15th September, from the chief magistrate of the city to the government. It stated, that "the disorder was raging with extreme violence, particularly in the poor and unhealthy districts of the town and suburbs." Here, truly, the scene was deplorable. To convey an idea of the complicated wretchedness of the lower classes of Hindoos and Mussulmans at this period, it will be necessary to speak of their habits and places of abode. The "City of Palaces" forms only one (the English) half of the city of Calcutta; the other is the Native town, which contains, in con-

nection with the suburbs, at least 500,000 inhabitants. The Native town is chiefly composed of miserable lanes, narrow, dirty, and unpaved; and the majority of the dwellings are low huts, with side-walls built of mud, mats, and bamboos, and covered with small tiles. Amongst the swarming population of these filthy receptacles, in which all descriptions of disgusting animal and vegetable odours abound, the distemper ran a long and wide career of destruction. Barely existing on a meagre diet of bad rice, the poor workmen, who had been abroad all day pursuing their laborious avocations in the sun, returned to their hovels in the most fitting state of body to contract the disease. Exhausted by the heat and fatigue, and confined during the night with their families, often six or eight in number, in a small space to which fresh air was a stranger, they were attacked by cholera in hundreds; and a frightful proportion of those attacked were swept away in the lapse of a few hours. This was more especially the case in the lowest part of the town and suburbs; and in the adjacent villages of Kidderpore, Manicktolla, Entally, Chitpore, Sealdah, &c. The condition, indeed, of the inhabitants of the latter places, is hardly to be imagined. These villages are made up of mud or straw huts, which

are individually from six to twelve feet square, and are so huddled together that there is scarcely room to pass between. In each of these unhealthy habitations a whole family resides, and, not unfrequently, cows and other domestic animals are added to the proper inmates. These dependencies, moreover, are everywhere intersected by pools, broad ditches, and channels, which in the rainy season become the reservoirs of foul water and corrupt weeds.

Whilst the contagious cholera was raging in Jessore and Calcutta, its ravages had been extending in every other direction. Before the end of September, the pestilence had spread throughout and beyond the province, from the eastern limits of Purneah, Dinagepore, and Silhet, to the extreme borders of Balasore and Cuttack; and from the mouths of the Ganges nearly to its confluence with the Jumna, a space measuring in length, and also in breadth, upwards of 400 miles. All places of note in the province of Bengal, sooner or later, in a greater or less degree, were subjected to its visitations. Even at this time few towns or villages, in an area of several thousand miles, escaped the invasion. The cities of Dacca and Patna, the towns of Balasore, Burrishol, Burdwan, Rungpore, and Malda, suffered severely. Across the

whole extent of the Gangetic Delta, and especially in the tracts bordering the Hooghly and Jellinghy rivers, the mass of the population was sensibly diminished by the pestilence.

The scourge now spread from Bengal to the adjacent provinces, and with its geographical progress in this new sphere of action, some peculiarities were developed which had not been previously observed. In Bengal the disease extended freely and rapidly in every direction, probably because the contagion had been generated in different localities about the same time, and its extension favoured by the uniform character of the soil, atmosphere, and inhabitants; but in the upper provinces of Hindostan its effects were limited, at first, to particular lines and divisions of the country. Instead of spreading from Muzufferpore, Chupra, and Ghazipore, through the contiguous districts of Gorruckpore and Juanpore, to the provinces of Oude and Rohilcund, it subsided in that part of the country, and infested the tracts lying west of the Ganges and Jumna. Thus, from the beginning of November, when it declined in Muzufferpore, and during the lapse of several succeeding months, not any district of the large sweep stretching to the east of these rivers, from the northern point of Saharunpore to the southern

boundary of Tirhoot, was visited by the distemper. During a subsequent inroad, however, these districts suffered severely for their previous immunity.

On the other hand, by pursuing a north-westerly course, the pestilence, at an early period, had penetrated along the Ganges, its navigable tributaries, and the high roads, into the interior of that part of the country. The appearance of the malady was announced the 6th of November, in the grand army then stationed in Bundlecund, a portion of the Allahabad province. This army had been assembled in anticipation of a war with the Pindarries, a predatory horde of native cavalry, and the centre division, consisting of 10,000 fighting men, and 80,000 camp-followers, was encamped on the banks of the Sinde, under the immediate command of the Marquis of Hastings. It was here that the cholera exhibited its most destructive power. Before or since there is not any instance upon record, in which the comparative mortality has been so extensive. The first cases were observed amongst the lowest classes of the camp-followers, and excited little alarm; but, increasing in virulence with the number of its victims, the disease soon spread to every description of people, and in every direction. Previous

to the 15th, it had extended throughout the camp, and, contrary to the usual disposition of the malady, equally attacked the males and the females, the young and the old, the weak and the robust. Europeans and Natives, fighting men and camp-followers, were alike selected, and as helplessly sank within its death-grasp. At this time, so concentrated was the contagious poison, that in resisting its effects, the only apparent advantage possessed by a strong over a weak constitution, was the power of postponing the catastrophe for a few hours. The English soldier usually perished within six or twelve hours after the accession; the Sepoy within three or six. From the 15th to the 20th, the mortality had been enormous, and the stoutest hearts were beginning to despair of escape. It was a common occurrence for sentries to be suddenly seized at their posts, and having been carried in, to have two or three successors before the two hours' duty was performed. Latterly, the Hindoos being unable to convey the numerous bodies of their deceased relatives to the river for the purpose of the customary ritual, they were thrown promiscuously into the neighbouring ravines, or hastily committed to the earth in the places where they had expired. The camp wore the aspect of a general

hospital. The medical officers, night and day at their stations, were no longer able to administer to the crowds of sick that continued to arrive from every quarter. The scene formed a striking contrast to what it had been a few days before. The noise and bustle almost inseparable from the presence of a multitude of human beings, had nearly subsided into stillness. Nothing was to be seen in motion save a solitary individual here and there anxiously hurrying from one place to another to inquire after the fate of his companions. Nothing was to be heard but the groans of the dying, and the wailing for the dead. The natives, perceiving their only hope of safety in flight, now deserted in great numbers. But the precaution frequently deceived them. The fields and highways for miles around were covered with the bodies of many who had carried with them the seeds of the distemper.

That the language employed in describing this melancholy picture is not adopted from any motive unworthy of science, or in the slightest degree an exaggeration, will be evinced in the authenticated account of the mortality which took place during a few days. In the five days included between the 15th and 20th of the month, the number of deaths, as published in the govern-

ment report, amounted to FIVE THOUSAND. Had the pestilence continued to spread and destroy after such a frightful manner, the camp would soon have been depopulated. But the Presiding Intelligence, who permits the growth of physical evil, to serve, doubtless, as an agent in the production of ultimate good, has also determined the limits of its increase. The cholera, which raged to an unparalleled extent on the 20th of November, was deprived, at the end of the three following days, of its infecting power. Few new cases occurred after the 23rd, and those that did occur were of a mild and tractable nature. The camp was cumbered, however, with a multitude of sick; and the Marquis of Hastings, to facilitate their recovery, resolved on changing the site of his encampment. Accordingly, the division, with as little delay as possible, commenced its march in a south-easterly direction, and, after several intermediate halts, took up its position near the Betwah river, a distance of fifty miles from the Sinde.

It is impossible to calculate the change which the political fortunes of India might have undergone, had the Pindarries taken advantage of the grand army while it was labouring under the pestilential scourge. The enemy numbered upwards

of thirty thousand horse; and, in addition, as the Marquis of Hastings soon had occasion to know, they had come to an understanding with Scindia, a powerful Mahratta chief. In delineating the rise and progress of the war, on his return to the Presidency, the Governor-General thus spoke of the visitation: "The dreadful pestilence, which made such havoc in the division under my immediate command, forced me to leave the banks of the Sinde, and to seek a more favourable country for the recovery of my numerous sick. I did not find this until I was fifty miles from the river which I had quitted. Fortunately, the change of air was rapidly beneficial; for a very short time had passed, when I received intelligence of an invitation said to have been given by Scindia to the Pindarries."

Distressing as was the spectacle presented by the army in camp, the line of march afforded a scene, if possible, still more affecting. Every means had been taken to furnish the sick with proper modes of conveyance: the ammunition-carts were resigned for their service; elephants and draught cattle were collected from every quarter—but, the accommodation falling short of the extraordinary demand, a considerable part was necessarily left behind to await the transmission

of their more fortunate comrades. Yet, eventually, it did not appear that the latter had much cause for gratulation. In their progressive movement, the grounds which they occupied during the night, as temporary encampments, were generally found, in the morning, strewed with the dead like a field of battle: and their daily route resembled that of an army retreating under every circumstance of discomfiture and distress. In the short period that elapsed between the 6th of November and the 8th of December—after which no fresh case of the malady was observed—of the 10,000 fighting men, 764 had fallen victims; and of the camp-followers, about 8,000 perished, or one-tenth of their whole number.

A superficial acquaintance with the progress of cholera, might lead some to suppose that its decline in the grand army was connected with the change of locality prescribed by the Commander-in-chief; but the history of the disease shews, on the contrary, that it had run through its course of infection *before* the army quitted the banks of the Sinde, and that the only benefit derived from the change of air was the assistance it afforded in the recovery of the multitude of people who were lingering under the effects of an old attack. To ascribe, indeed, the cessation of the pestilence to any

virtue in the soil or atmosphere of the encampment by the Betwah, would be little less than absurd: for the troops did not arrive there until the 19th of December, and a new case of cholera had not been observed during the eleven days which immediately preceded their arrival. If additional evidence were really necessary to settle this point, it would be amply furnished in *the law of increase and decline* appertaining to cholera, which we have endeavoured to explain and illustrate in another place. This law informs us that when the malady has been developed in a camp, it will continue its ravages through the period of one month, or so, independent of locality—whether the infected camp be removed from a moist to a dry district, or from a low to an elevated station—and, at the expiration of the monthly period, that the disease will die away spontaneously, and give little further trouble for a time.

Having decimated the grand army, and still extending along the track of the principal rivers and great roads, the cholera visited every considerable town and village of Bundlecund; it was afterwards communicated, in succession, to the provinces of Berar, Malwah, and Candeish, and eventually to almost every portion of the Deccan.

From Saugur, a large town in the province of Malwah, the contagious current diverged in two directions. One branch pursued a south-westerly route. Having passed through several towns, and through Sir J. Malcolm's camp at Mhow, it entered Mahedpore the 12th of May, when, adhering as before to the neighbourhood of the Chumbul river, it successively attacked Sonara, and the camp of Holkar in the immediate vicinity. At length, in the month of June, the populous town of Kota, situated along the east side of the Chumbul, was invaded. Kota is built upon the solid rock; and here the banks of the river are rocky, and the channel deep and narrow. The mortality, notwithstanding, was very great. About one hundred persons died daily for some time, which struck the inhabitants with so much dismay that they abandoned the city.

The second branch took a southerly course from Saugur, and, after attacking the Left Division of the army, and the Nerbuddah field force, it extended through the states of Nagpore and Poonah, to the presidencies of Bombay and Madras. The troops under Major-General Marshall, during their march to Mundelah, fell in with the disease at Jubbulpore, on the Nerbuddah river, and suffered from its effects during the remainder

of their route. The mortality, however, among the regular troops bore no proportion to that recorded in the Returns of the Centre Division.

Following the channel of the Nerbuddah, the disease next reached Husseingabad, and, afterwards, departing from that place, proceeded southerly, through the town of Mooltay, to the city of Nagpore, where it arrived in the last week of May. Both of these places, and many of the intermediate villages, were severely scourged. Mooltay itself, though an inconsiderable town, lost above five hundred of its inhabitants.

The Nagpore Subsidiary Force under Colonel Adams, afforded a striking instance of the influence exercised by the contagion over a large body of men previously free of disease. In the beginning of May, this division had been occupied in besieging the important fortress of Chandah. In the siege much fatigue was experienced, which, with constant exposure to the sun, produced a few casualties; but nothing like a marked tendency to sickness had appeared among the men. Returning, however, some time after to Nagpore, the troops encamped, the morning of their last march, at a village distant nine miles from the city. Here the report had scarcely reached the encampment that the cholera was raging in the neighbourhood,

when the troops themselves were attacked. As it usually happens, the early seizures were the most severe. Many individuals who were suddenly afflicted, while obtaining supplies of domestic necessaries in the vicinity, were brought in either expiring or altogether dead. Of seventy cases admitted during that night and the day following, about twenty died. The later instances of attack were equally numerous; but in these the corporeal exhaustion was less sudden, and the subsequent symptoms were also of diminished severity.

A retrospective glance must now be directed to the course described by the cholera in travelling from the junction of the Ganges and Jumna over the greater part of the Northern Provinces of Hindostan. In the end of March, 1818, the disease became developed in Allahabad, and, moving progressively through this town and district, it destroyed ten thousand of the people in the lapse of a few months. On the western bank of the Jumna, and among many of the towns in the Doab,* its progress could be distinctly traced from place to place.

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* A name given to the tract of country which lies between the rivers Ganges and Jumna.

Keeping close to the banks, the pestilence ascended the Ganges, and entered Cawnpore the 8th of April. It equally attacked the city, the military cantonments, the civil station, and the adjoining villages. In May it reached Etawah, and from thence, without infecting many of the intervening places, it stretched across to Futteghur. Meerut and Agra were soon included in the contagious chain; and, by the 20th July, the malady was evinced in Delhi, where it remained nearly a month committing great havoc among the dense population of the imperial city. Neither between Agra and Delhi, nor during its route from the latter, did the contagion manifest itself in many of the intermediate towns and villages; and it is worthy of remark, that the majority of the places that escaped were situated in low, marshy grounds, and exposed to the effluvia of much animal and vegetable matter in a state of putrefaction.* The immunity enjoyed, therefore, could not be ascribed to a healthy location.

From Delhi the disease would seem to have spread in a south-west direction to the principality of Jeypore, the capital of which it reached in the

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* Bengal Report.

latter end of August. Here it was neither very general nor virulent, being almost confined to the most wretched class of the inhabitants. The whole mortality, including that of the circumjacent country, scarcely exceeded one thousand persons. The distemper began to abate in the city the 12th of September; but, during the 14th, it appeared in the camp of a detached force commanded by Major Agnew, at a place called Titirya, a distance of twenty-five miles from Jeypore. In the camp the cholera assumed a virulent character, and continued to extend until the 28th of the month, after which it gradually abated. Of 96 Europeans and 4,100 natives, composing the fighting men, the admissions were 292, of whom 122 died. Among the camp-followers, the casualties could not be correctly ascertained. The contagion appears to have been exhausted in this direction; for the present invasion did not extend to the town of Ajmeer, which is only eighty miles distant from Jeypore. The valley of Ajmeer also escaped; and its exemption is the more remarkable, as a large division of the Rajpootana troops were encamped in the valley at the time, on similar soil, and under external circumstances perfectly analogous to those of their less fortunate comrades at Titirya.

In April and May, the Middle Provinces of Hindostan were invaded. It has been previously observed, that these parts of the country escaped when the cholera first appeared to the east of the Ganges; but now the contagion penetrated to every quarter, and carried off a vast number of the people. Its ravages were particularly severe in the city of Lucknow, the present capital of the kingdom of Oude, and in Fyzabad, the ancient capital. In the district of Gorruckpore, also, which, had formerly escaped, the destruction of human life was very great; thirty thousand persons are said to have perished. At an early period the inhabitants deserted the town of Gorruckpore, and sought refuge from the pestilence in the adjoining groves and villages.

Short and rapid as is the preceding outline of the early progress of cholera, it may enable an attentive observer to suspect the existence of some of the laws and habits of the pestilence, which have been since more fully developed. In travelling from one district to another, the marked predilection shewn in the choice of navigable rivers and great roads, as the medium of communication, might lead to the suspicion that the disease was contagious, and that it had been propagated through the crowds of people who

frequent the lines of general intercourse. This would be further supported by knowing that the disease, though chiefly dependent for its origin, in the first instance, to the climate, soil, &c. of Bengal, had afterwards extended to the other provinces of Hindostan, where the climate and soil were of a different character, and where it had prevailed independent of the weather—its attacks being equally fatal and extensive in the months of winter and summer, and in their subdivisions, whether cold, hot, or rainy. We shall now proceed to lay before the reader a variety of abstracts, taken from the numerous Reports furnished by the medical men in India to the Government, during the prevalence of the cholera in the presidencies of Bombay and Madras. These authenticated documents will materially serve to elucidate both the laws which govern the distemper, and the method of cure, to be founded on the dictates of experience and reason.

SECTION II.

Abstracts taken from the Medical Reports compiled in India, by order of the Government.

ABSTRACT, No. 1.*—The 6th of August, 1818, the cholera broke out at Panwell, a considerable village situated in the main line of intercourse between Poonah and Bombay. Panwell is distant from Bombay about fifteen or twenty miles, and is separated from the latter by an arm of the sea. Between these two places the communication is freely maintained, through the medium of boats. During the 9th or the 10th of August, (as appears in Dr. Taylor's report,) the first case of cholera occurred in Bombay, and it could be traced to a man who had arrived that day from Panwell. It is also evident, from Mr. Jukes' report, that it spread north and south along the sea-coast from the same place, and that it was

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* From the Preface to the Report of the Bombay Medica Board.

imported to a village in the neighbourhood of Tannah, in the island of Salsette, with a detachment of troops that escorted a state prisoner from Panwell to that garrison. In the town of Mahim, at the extremity of the island, and which is distant only five or six miles from the principal native town of Bombay, the disease did not break out until it was first established in the latter. It then gradually spread over the western side of Salsette, through which the road lies from Bombay to Surat and the northern countries, and by which, during the south-west monsoon, is the chief line of communication. Aware of the danger of the malady, and with the humane view of relieving the sufferings which it inevitably produced, some individuals carefully watched its progress. Assisted by their observations, we are enabled to trace the disease, as if creeping along from village to village, over the island of Salsette, precisely in the same way,—that is, by the arrival of people affected with the disease from places where it was known to prevail. And we are assured that some of the villages on that island, in the absence of this sort of communication, or from some other cause, have, after a lapse of four months, hitherto, entirely escaped.

From the foregoing detail, we are disposed to conclude, that this epidemic is not only different in its nature from those that have been hitherto observed, but that it may be said to stand alone in regard to some of the more essential characters which usually distinguish such diseases. It appears to us, however, that the cause of cholera is capable of being transported from one place to another, as in cases of ordinary contagion and infection, and that it has also the power of propagating itself by the same means that acknowledged contagions are accustomed to do.

In October last, when the disease had almost disappeared at Tannah, the attention of Mr. Jukes was called to a case that had appeared in one of the apartments in the barracks of that Fort, appropriated to the European troops. Owing to the late application for medical aid, this case terminated fatally. Another case occurred a few hours afterwards, the subject of which was saved with much difficulty and danger. In the course of six succeeding days, no less than nine cases occurred in the same apartment. The curiosity of Mr. Jukes was naturally excited to ascertain under what circumstances so much disease was produced, and, on examination, the ward appeared

to be both badly ventilated and too much crowded with men. The place was immediately emptied, scoured, and fumigated; after which no other case happened among the inmates.

After the middle of December, when we had flattered ourselves that the cholera was diminishing as the cold season advanced, the number of patients considerably increased in this island (Bombay), and in Salsette, and the Conkan, which consequently excited much alarm. In some instances these cases have been confined to particular spots, and sometimes to particular houses, where the disease has attacked, in succession, whole families, consisting of three, four, or five persons; while in others, only a single case, or at most very few, have occurred. The first attacks invariably proceed to a fatal termination, when not opposed by the use of medicine. Poverty, dirt, &c., powerfully predispose the mass of the population to the reception of the disease; and, though not necessary to its production, they prepare a less limited range for the operation of the original cause, whatever that may be. Sad experience, however, has shewn that the absence of the common predisposing circumstances affords no security against the attack; but it appears that a smaller proportion of the higher orders of

society has suffered on this side of India than in the Bengal presidency. In Bombay, the disease has been nearly restricted to that class of the population which is most exposed to the severest labour and privation. These people, occupied in obtaining a daily subsistence, feel little inconvenience while the excitement of labour and exercise remains; but the moment the excitement subsides, they are peculiarly exposed to the inroads of the contagion: hence it has been observed that the attacks are most frequent during the night.

No. 2.*—Neither the strong contrary monsoon winds, then prevailing, nor the insular situation of Bombay itself, appear to have had any influence in exempting it from the attack of the cholera; which, advancing from the eastward, made its appearance on the island about the middle of August, and spread with rapidity from one end of the island to the other. The disease seems to have attained its height about the end of that month, or the beginning of September, when three

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* George Ogilvy, Surgeon, to the President of the Medical Board, Bombay.

or four hundred cases were occurring daily. Soon afterwards it began to decline; at first rapidly, and subsequently in a varying though much diminished degree.

The malady has been chiefly confined to the natives. Very few Europeans were attacked; and of these, the highest orders seem to have almost entirely escaped. I have, however, observed that the Parsees, who approach nearer to Europeans in constitution and habits of life than many of the other classes of natives, have suffered considerably. In the Fort many were seized, and the disease was sometimes extremely rapid and formidable.

As the first symptoms of the cholera are frequently slight, it has been remarked that many medicines may have had the credit of curing cases of the disease, which might have proved to be merely attacks of cholic, or any thing else; and that the opinion formed of the remedies had been, in consequence, too favourable. That this occurred, now and then, is not improbable; but, in so far as my observations go, it certainly did not happen to any extent. In some instances, where I had an opportunity of watching the patients, I delayed giving medicines as long as could be possibly ventured with safety, for the purpose of

ascertaining whether they were actually cases of this complaint in its early stages, or otherwise; and in almost every one of these I was compelled to have recourse to vigorous measures in the end. The success which has attended the remedial means adopted here, and the small proportion of deaths that have occurred, when compared with the thousands attacked, are, I think, chiefly to be attributed to the great alarm which the disease excited on its first appearance in the island, and the consequent promptitude with which the natives applied at the numerous stations for assistance, every thing depending on the early administration of the remedies.

An example of the insidious manner in which this disease not unfrequently commences, occurred in a servant of my own. While I was absent, on a short visit, he had been twice slightly purged, and, on my return, he complained of a trifling uneasiness in his bowels. He looked dark round the eyes, and his pulse was somewhat small, but had the cholera not been prevalent, it is doubtful if I should have thought any thing of the symptoms. It was now about ten o'clock, a. m.; I gave, as soon as the medicine could be procured, twenty grains of calomel, together with a dose of the mixture, which is kept ready prepared at the

different stations, containing a drachm of laudanum, with some brandy and peppermint. These were retained in the stomach, but they did not entirely check the symptoms. There was occasional sickness, and pain in the region of the stomach. A small dose was administered about twelve o'clock, and fomentations ordered. He was allowed to remain in his own hut, and appeared to be doing well until the approach of evening, when some fluid which he had incautiously taken, brought back the symptoms in a most aggravated shape. I found him, at eleven o'clock at night, lying exhausted in his cot, with the most violent retching and purging recurring incessantly: he was bathed in profuse cold perspirations, his pulse was almost gone, his countenance shrunk and ghastly; burning heat and pain were complained of at the stomach, and cramps and twitchings in all his limbs. I gave him immediately, four grains of the extract of opium soaked in the oil of peppermint, which he fortunately retained, and I had him instantly conveyed to the hospital. The hot bath was ordered; and, while getting ready, an enema containing half an ounce of laudanum was exhibited: he remained in the bath, which was as hot as could be borne, for a quarter of an hour, when he became languid

and sleepy. He was then well dried, and placed between warmed blankets. He soon fell asleep, and a gentle and warm moisture broke out almost immediately afterwards; orders were given that he should not be disturbed by unnecessary interference: in a few hours he awoke free of all immediate danger. During the whole of the attack, there was no appearance of bile in the evacuations, and some days elapsed before the biliary secretion was perfectly restored. For this purpose, and to hasten convalescence, it was necessary to give him small doses of calomel occasionally, and common purgatives, which, with cordials, light nourishing diet, and a small proportion of wine, brought him gradually round. His wife, who was in a bad state of health at the time, attended him during his illness. She was attacked with cholera about three weeks afterwards, and died of the disease.

I have seen the medicines given in double doses by mistake. An instance occurred to myself in treating a Sepoy who was reported to have fallen down in a kind of fit. I found him recovering from a state of insensibility, and complaining of a most excruciating pain at the stomach, with sickness, giddiness, and slight spasms or twitchings in the calves of the legs, and in the

arms. His countenance was shrunk, and his pulse small; so no time was to be lost. The usual medicines, to be found in almost every house, were administered. He was then conveyed to the hospital, with orders that the warm bath should be prepared, but that no treatment should be carried into effect before my arrival. I followed immediately afterwards, with the intention of placing him in the bath, and bleeding him. The note of instructions, however, sent with him, had miscarried, and I found at the hospital, that the dose of medicine had been repeated the instant of his admission. This patient had taken, therefore, forty grains of calomel, and upwards of a hundred drops of laudanum, in less than half an hour: he was now inclined to sleep. I ordered that nothing should be done to interfere with his slumbers; and in three or four hours, he was as well as ever he had been in his life. The medicine seemed to have no other effect than that of arresting the symptoms, which were making rapid strides.

Although vomiting and purging are generally among the first evident symptoms of this disease, yet I have never found them to prove the most formidable; one or other is not unfrequently absent, sometimes both, and they usually yield

to medicine without any great difficulty, even in cases which ultimately prove fatal. The name "cholera," which the disease has received in reference to these symptoms, would convey a very erroneous idea of it.

Pains, or burning heat at the stomach, and spasms, in some degree or other, have been rarely, if ever, entirely absent in the cases which have fallen under my observation. In some, the spasms have been so extremely violent as to render it requisite to have the patient held down. In others, and much more generally, the cramps were confined to the limbs, and less severe; very often, indeed, amounting only to a kind of gnawing or creeping sensation. In a great majority of these cases, the head has not been materially affected. The patients have frequently retained their senses to the last, answering questions rationally within a few minutes of death. In a few instances, however, the stupor has been very great.

Notwithstanding that the disease is much more under the control of medicine when the symptoms commence with slight purging or vomiting, and follow each other in gradual succession, yet it does not appear to me to be less certainly fatal, under these circumstances, *if left to itself*, than when the patient is attacked suddenly with giddi-

ness, coldness, loss of pulse, and all the most formidable symptoms.

Excruciating pain, or burning sensation at the stomach, severe spasms, or an affection of the head, seem to indicate the immediate use of the lancet; and, in these cases, I have had recourse to venesection without delay, and generally with the most decided advantage. When, in addition to the spasms, there is some heat of skin and quickness of pulse, (symptoms I have occasionally met with in the commencement of the disease,) it has appeared preferable not to use the bath so hot as in the later stages, when the stronger stimulants are required. A moderate warmth at this period seems to relax the surface better, and it proves more soothing. If there is much determination of blood to the head, I am cautious in pushing the laudanum, and indeed, in all cases where the symptoms are inclined to give way, I discontinue its use as soon as possible. Other measures then become requisite, but, under the limitation mentioned, the opiates carefully prescribed have proved invaluable.

Not unfrequently the mouth becomes affected by the calomel which is given within the first few hours, and in such cases, the secretions afterwards come round more speedily to their natural state;

but I never prescribed calomel, in the first instance, with the intention of causing salivation, for the patient is generally either dead, or out of danger, before the medicine could produce this effect. The natives, also, having a strong prejudice against mercury, it becomes advisable to obviate its salivary effect as much as possible, lest these patients should be deterred from seeking relief.

Examination after death shews, that in cases of cholera there is a great accumulation of blood in the large vessels, and internal parts of the body. Apparently, they are gorged and oppressed by the sanguineous fluid, and, every measure tending to restore the equilibrium of the circulation, one would naturally suppose, must be useful. Blood-letting appears to have this tendency, by removing part of the oppressing liquid, and drawing the remainder into circulation. Advantageous results may possibly be anticipated from blood-letting, on other principles; but I shall not attempt to theorise.

In severe cases, there is often much oppression at the chest, with great restlessness and anguish; and these not uncommonly prove most distressing symptoms. By far the most formidable symptom, however, in this extraordinary disease, both in

appearance and in reality, is the remarkable coldness of the skin, depending on the diminished energy of the circulation, which seems almost entirely to desert the surface. Many in this state eventually recover, by an assiduous and unremitting perseverance in the measures already described; but it frequently happens, that every thing we can do is alike unavailing. The case is truly desperate.

I have tried blood-letting repeatedly, in this stage of the disease. It has very often happened that I could not get the blood to flow by any means whatever, and even if the desired effect were obtained, it has generally failed, as well as all other remedies, in doing any good. Yet it should be observed, that I have treated several cases in which advantage was derived from blood-letting, under the most discouraging appearances; and I am not aware that I have seen it injurious.

It is chiefly, however, in the early period of this disease, to meet the urgency of particular symptoms, as previously mentioned, that I have resorted to blood-letting, and then with the most unequivocal success. But, with respect to natives, generally speaking, bleeding is not required, and the other remedies, when administered in time, overcome the disease.

Unless in some few instances which prove very suddenly fatal, or in those cases where the remedies, had recourse to early, have arrested the symptoms, I have always found the remarkable coldness of the surface, and partial suspension of the circulation, ensue sooner or later. I am induced to consider them the most prominent features of this truly singular malady. Indeed, their presence may generally be recognised from the very commencement, and their progress is at times exceedingly rapid.

I have seen several cases in which, after the violent symptoms were subdued, the patient has continued in a low inactive state, with a distinct though contracted pulse, and death-like coldness of the skin, the eyes yellow, and the countenance pallid. One patient died suddenly in this way, on the third or fourth day after he had got over the violence of the attack. My attention, therefore, was particularly directed to its recurrence. It has been always removed by calomel, in large or small doses, according to circumstances, followed up by purgatives, mild cordials, and light nourishing diet.

In two or three patients I have observed very extraordinary convulsive motions of the extremities and head, recurring at short intervals. In two females these vibrations were very remarkable

in the muscles of the belly, and seemed to depend on the augmented irritation arising from worms. They were both Parsees. In one of them the pain and the burning heat of the stomach were so excessive as to induce me to bleed her twice, though of a weakly habit. The calomel, followed by jalap and castor oil, produced immediate relief, and also destroyed the worms. Among the natives such creatures are very common, and have no connection with the disease of cholera in particular, further than by aggravating, or modifying some of its symptoms. It is no unusual occurrence for the powerful medicines, which are administered in the cure of the latter, or even the violent symptoms themselves, to destroy great numbers of these worms.

I have seldom used blisters in the treatment of cholera, unless that the head has been particularly affected, and the patient in a state of stupor, or to remove local symptoms consequent to the disease. When the patient was seen at the commencement, I have found the common remedies prove very generally successful; and in the latter stages, when the pulse is gone, and the patient cold, I have been induced to rely more on the hot bath, stimulants, frictions, and other remedies of a general nature. The sooner medicine is had

recourse to in this disease, the greater is the chance of recovery. Its awfully rapid progress admits of no delay. The general remedial means, then, are—blood-letting, calomel, opiates, the warm bath, friction, and the external application of heat, in all its various forms, blisters, ether, hartshorn, brandy, and other powerful stimuli, purgatives, &c. The whole of these may become requisite in the different stages of one individual case; but all of them are not always necessary, and some of them are, no doubt, at times, decidedly injurious. Each remedy is to a certain extent useful, and much may depend on their judicious selection and combination, in the management of various cases.

The continuance of this epidemic through all the seasons of India, and the extraordinary manner in which it seems to travel, have occasioned different opinions with regard to its being contagious, or otherwise. So much doubt, indeed, exists on this point, that it may be presumption in me to offer an opinion. Of the two native corps now here, and of which I held a temporary charge, during the indisposition of the medical officer attached, the cholera was much more prevalent in one than in the other, and in a much more aggravated form. From this circumstance

I can draw no positive inference that implies contagion. The former is a newly raised corps, consisting chiefly of recruits, who have been more drilled, and who possess fewer comforts than the old sepoys. Many of the newly raised men, also, were deficient in clothing, and consequently were unable to change their dress when they happened to be exposed to rain in the time of parade. That the corps in question was more predisposed to disease from some particular cause or other, (the local situation of both being the same,) is very evident, in the greater number of cases of severe bilious remittent fever that occurred in it. None of the hospital attendants were attacked with the cholera, though they were assisting the patients day and night. Hummauls, it has been observed, have suffered more here than many of the other castes. So have fishermen. It has been, I think justly, remarked, that fatigue, poor diet, bad clothing, and exposure to cold and moisture, particularly predispose to the disease.

No. 3.*—The first case of cholera was in a woman. She had been taken ill after sunset, the

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* Dr. Taylor, to the President of the Bombay Medical Board, 16th Nov. 1818.

preceding evening, with vomiting of a whitish watery fluid, accompanied with severe pain at the pit of the stomach, and general cramps. When I saw her, the evacuations had ceased for about two hours. She complained only of what she termed knots in the muscles of the legs, arms, and belly, and of pain at the pit of the stomach, which, however, was less violent than at the commencement of the attack. There was great prostration of strength, and the pulse at the wrist and temples was imperceptible. Her mouth felt excessively parched; her tongue was foul, and the desire to drink cold water was very urgent. Her limbs were quite cold, and her countenance had a deadly appearance. During the night, some ginger and opium mixed with honey had been administered, and frictions, with warm spirits, had been applied, which diminished the spasmodic pains. I gave her twenty grains of calomel and eighty drops of laudanum, and directed fomentations to be used; but she died in an hour and a half after I saw her.

Aware of the desire manifested by your Board to ascertain, if possible, the manner in which the disease had originated in Bombay, I directed some inquiries on the subject. In reply, I was informed that, four or five days before, an inhabitant of

Gunesa Wara, immediately on returning from a visit to Poonah, (the disease at this time raging at Panwell,) had been attacked with cholera, and died; that on the day following, his wife, and the wife of a man who lived next door, had also been seized with the same complaint, of which both eventually died; and that almost immediately afterwards, two other neighbours, an old woman and her grand-daughter, had fallen victims.

In the lane where these cases had occurred, the disease continued to spread during the five or six days following my first visit, after which it nearly subsided, and appeared only occasionally in one or two individuals. Seven other cases were observed on the 16th, in different parts of the native town; but the next fatal case which came to my knowledge happened on the 17th. The man had been taken ill during the night, and in the morning one of my assistants had been sent for. It was too late to perform any medical service: the patient died in five minutes after the assistant's arrival. This occurred in a pretty populous place above the jail. Soon after the preceding misfortune, a considerable number of people residing in the neighbourhood were attacked, and two or three of them,

who did not resort to the use of medicine, were carried off.

Still, however, the reported cases were not numerous; only twenty-six were returned on the 18th of the month, and on the 19th twenty-two. But this may have arisen in the limited number of my assistants, who were employed in visiting different parts of the town; and, as they consisted of three or four persons, were insufficient for the duty. When, under your orders, I obtained a large establishment of assistants, the number of reported cases amounted to no less than 109.

The progress of the disease during the next six days was extremely rapid. On the 25th, the cases seen by my assistants were 318, and on the 26th, 293. From this time, however, you will perceive that the malady began to abate almost as rapidly as it had commenced. On the 1st of September, the patients in my reports were 137 in number; on the 15th, 97; on the 1st of October, 75, and on the 15th, 55. It continued decreasing till the 8th of November, when the cases reported were only 16. After this period the cases slightly increased again, and for the last few days they have fluctuated between twenty and thirty. A day or two of hard rain seemed to augment, in a small degree, the number of cases; but in other

respects I have not perceived that the disorder has been much influenced by the state of the weather.

From the name "Cholera Morbus," which has been given to this disease, we should have supposed that vomiting and purging, and especially of bile, were the invariable and most distressing symptoms. In a number of cases, however, there was neither vomiting nor purging, while in others, one only of these symptoms was present; but in none was there the slightest appearance of bile. The spasms, which, with a very few exceptions, were a constant feature of this disease, became in some instances so violent as to produce the utmost distress and agony. The patients were often seen tossing themselves forcibly in every direction, and calling out to the bystanders to lay hold of their limbs, or to sit down upon them. In one case, the patient screamed out in dreadful torture, that his legs and arms were breaking. Locked-jaw occurred in several instances; while others complained of a sensation as if their bodies were pricked with pins.

Three different forms of the disorder have been noticed by accurate observers, and, I think, with judgment. In the *first* form, the patient is attacked with slight pain in the bowels, which

gradually increases, and is followed by vomiting, purging, and spasms. After these, coldness of the limbs, loss of pulse, and clammy sweat, gradually supervene. Under the first form of the malady many cases were witnessed, where the patients, having allowed six, eight, or even ten hours to elapse without applying for medical aid, ultimately recovered by means of calomel and laudanum, with stimulants and fomentations; but the remedial measures should never be postponed, as the chances of recovery are much diminished by delay. The following case will furnish an example of the danger.

A stout, healthy lad, of about fifteen or sixteen years of age, came to me complaining of a slight uneasiness in the bowels, which he said did not amount to pain, and he requested that medicine should be given to him. Supposing it to be merely one of those trifling affections which are daily met with among the natives, especially at this season of the year, I only gave him six grains of calomel, leaving, at the same time, particular instructions that, in the event of his becoming worse, I should be sent for immediately. His complaint increased in the afternoon and evening; but, unfortunately, the person to whom my orders were directed, instead of calling me in, rested

satisfied with giving him six grains more of calomel. At ten o'clock next day, when I went to see the other patients, the lad was dead.

In the *second* form of the disease, pain in the bowels, vomiting and purging, are rapidly succeeded by great prostration of strength, extreme coldness in the limbs, and loss of pulse at the wrist and temples. The eyes are yellow, fixed, and sunk; the face and breasts are covered with a cold, clammy perspiration: the patient frequently lies in a state of stupor, and when roused, usually makes no complaint, except perhaps of spasms in the extremities, and of a feeling that he is about to expire. These symptoms often occur within an hour or an hour and a half after the first inroad of the disease. Almost all such cases which came under my observation, proved fatal. The calomel, and the large doses of laudanum, combined with the most powerful stimuli, produced no sensible effect; and when a vein or the temporal artery was opened, the blood either refused to flow at all, or only trickled down slowly in drops. In these cases I seldom had an opportunity of trying the warm bath; but in one instance, where it was used, it seemed totally to fail in rousing the powers of the system, or in relieving the symptoms.

Four or five cases of the *second* form occurred at my house. I shall only notice two of them. The first was that of a Kamati girl, about eleven or twelve years of age. She was brought to me about six o'clock in the morning, and was said to have been taken ill about three hours before. Her limbs were perfectly cold, the pulse was imperceptible, and her eyes were sunk in their orbits. As no blood could be obtained, I gave her some calomel, with a laudanum and stimulant draught. By these means she was for a time somewhat relieved; but she soon relapsed into a worse state. The warm bath was then used, and stimulant draughts were repeated at short intervals, yet without avail. She expired in three or four hours after I saw her.

The second case was that of a Fakeer, who, while attending a religious festival held by his caste, to avert the direful attacks of the *juree muree*, or fatal disease, was suddenly seized with severe pain in the bowels, which was immediately followed by slight vomiting and purging. When brought to me, an hour and a half afterwards, he had most severe spasms; his eyes were yellow and sunk, his extremities cold, pulse gone, and the skin covered with cold perspiration. Veins were opened in both arms, but scarcely any blood flowed.

Calomel and laudanum were then administered, and followed by stimulant draughts, fomentations, and bottles of warm water to his limbs and body. No relief, however, was obtained. He rapidly sank, and died in the course of three hours from the time of his being brought to my house. I had not an opportunity of using the warm bath.

In the *third* form of the disease, the patient falls down, suddenly deprived of sense. The pulse is often feeble and indistinct; but sometimes rather full and strong. When he recovers a little, he complains of great pain in the head, and giddiness, and frequently of pain in the bowels. In three instances of these attacks, locked-jaw existed.

Of the *third* form one case will be sufficient to notice. A woman who lived close to the bazaar, went out, about seven o'clock in the morning, to purchase some articles; while in the bazaar she fell down senseless, and in that state was carried to her home. One of my assistants was immediately sent for, and at his arrival he gave her an ounce of the common mixture. Alarmed, however, at this appearance of the disease, he instantly came to inform me of the circumstances. When I saw the patient, she had recovered a little from the state of insensibility, and her pulse was good, but she

had a considerable degree of locked-jaw. I bled her to the extent of twenty-four ounces and upwards; and as she complained before of pain in the bowels, I ordered her twenty grains of calomel, and, in the event of its being necessary, she was also to have a dose of castor oil. These measures were attended with good effects, and she speedily recovered.

These different forms of the disease are not to be regarded as distinct species, but merely as varieties produced by the same cause operating in peculiar constitutions, and in persons of diversified habits and situations in life. The practice in all these reports I have seen, was conducted in hospitals under the immediate eye of the surgeon, who had proper native assistants under him. I was amply provided with every convenience, for employing with promptitude the various remedies required. It was soon ascertained, however, that the circumstances under which relief could be afforded to the immense population of this island, were very different. In scarcely any instance would the prejudice of the natives allow them to receive medical assistance in hospitals, or places where numbers could be attended together. As the only course then left was to administer medicines at their own houses, the board was compelled

to employ a numerous establishment of native assistants, and, in the pressing urgency of the occasion, many were necessarily engaged who had not the slightest knowledge of medical practice. For their information and guidance, a general description of the disease, and of the method of cure to be observed, were translated into the Hindoostanee, Maharatta, and Guzerattee languages, and each of them was furnished with a copy of these instructions in the language which he best understood.

The method of cure which, after consulting with you, I ordered the native assistants to follow, was extremely simple. They were supplied with doses of calomel, each containing twenty grains, and a mixture composed of forty drops of laudanum, twenty drops of the essence of peppermint, three drams of brandy, and four drachms of water. The calomel was first given in powder, which was laid on the tongue, and then washed down with an ounce of the mixture. A similar dose was to be repeated in two or three hours, if the patient derived no material relief from the former; or to be repeated immediately, should the first be thrown up—a circumstance, however, that very seldom happened. In addition to these medicines, the assistants were ordered, in all forms of the disease,

where it was practicable, to use the warm bath; and when this could not be done, as was generally the case, to endeavour to alleviate the cramps and pain in the bowels, by fomentations with cloths wrung out of warm water, or by the application of warm bricks or tiles wrapped up in cloth. When the more violent symptoms were removed through the use of these remedies, and only some pain, perhaps, or uneasiness, remained in the bowels, an ounce of castor oil was exhibited. The patient received particular injunctions not to drink cold water, but to moderate his urgent thirst by the sparing use of warm rice-water. The assistants also were strictly enjoined not to suffer any one to be disturbed, who felt a disposition to sleep.

The majority of the people suffering from cholera were treated solely by the native assistants, and, considering every circumstance, the success attending their practice has been much greater than could have been expected. A similar mode of cure was adopted by myself, with the exception that I had usually recourse to bleeding in the first place. I was called to see a person who had been ill *eighteen hours*, and who had received from one of the assistants two doses of calomel and two laudanum draughts. At the time I saw him, though his mouth was affected, he had excruciat-

ing pain in the bowels, with distressing thirst and cramps. With some difficulty, I prevailed on him to submit to bleeding. I took from him twenty-four ounces at least; and during the time, the pain in the bowels entirely ceased. It was a little singular, that on his arm being tied up he lay down on his left side, which the people of the house said he had not been able to do before. He did not complain, however, of any uneasiness in the liver. As slight spasms still continued, I ordered him the warm bath. By these means, and the exhibition afterwards of castor oil, he perfectly recovered.

The next patient whom I attempted to bleed, had taken calomel and laudanum, which stopped the vomiting; but when I saw him, he had dreadful spasms, and was completely cold, and no pulsation could be felt at the wrist or temples. I opened veins in both arms, but not more than two or three ounces of blood flowed. Circumstances rendered it impossible to use the warm bath. He died in a short time.

The two next persons, in the treatment of whom blood-letting was employed, were cases of relapse. They were both females. Calomel and laudanum had removed entirely, for two or three days, every symptom of the complaint; but now the symptoms had returned, though their mouths were still under

the influence of the mercury. One complained of violent burning pain in the bowels, increased by pressure, much headache, and thirst. The other, in addition to severe twisting pain and sensation of heat in the bowels, had also urgent thirst and severe cramps. In both cases, the pain in the bowels was relieved instantly by bleeding. The warm bath was used in the second case with the best effect. One or two doses of castor oil were afterwards given, and these patients soon recovered.

After this period, bleeding was very generally adopted in the cases which I had an opportunity of seeing. Latterly, also, it was had recourse to by as many of the assistants as had learned to bleed, and sometimes it was urged even by the patients themselves and their friends. In almost every instance it relieved the pain of the bowels, and the spasms. When the principal symptoms were great oppression at the breast, laborious breathing, and a feeling of suffocation—or when the patient had locked-jaw, or general tremors, with giddiness—bleeding was the only remedy which afforded effectual relief. When it could be obtained, the quantity of blood generally taken away was twenty-four ounces; and after such copious bleeding, (for in a manner it may be called copious,) no case occurred to me of the disease proving fatal.

In two or three instances, however, it was found expedient to repeat the blood-letting.

But while blood-letting, in an early stage of the disease, and under certain circumstances, almost uniformly produced the most decided and salutary effects; it was, in general, unavailing in the latter stages, or in the worst form of the malady, during which the limbs were cold, the pulse not to be felt, and the eyes fixed and sunken. In these cases it was impossible to procure a proper discharge of blood, which merely trickled forth in drops. Opening the temporal artery was attended with no advantage. By this means I never could obtain more than two or three ounces of blood. At the time no pulsation existed in the artery, and unless in one or two instances, the blood flowed from the vessel without any pulsatory motion. Almost the whole of these attacks proved fatal. A few, however, in which the discharge of blood, though small, was followed by faintness and profuse perspiration, terminated favourably.

In the worst form, a small proportion of the almost hopeless cases recovered, though not the smallest discharge of blood could be obtained. One of these was a boy about twelve or thirteen years of age. He complained of excruciating

pain in the liver, and severe spasms; his pulse could not be felt, and his limbs were quite cold. In puncturing a vein, I had little hopes of obtaining any fluid beyond an ounce or two, drop by drop, as in former instances; but I was somewhat surprised to find that the incision was not even tinged with blood. It had an appearance as if made in a dead body. The boy, however, was saved by the free use of calomel and laudanum, with powerful stimulant draughts, composed of hartshorn, ether, and brandy. In three other patients, one of whom died, the incision presented a similar aspect.

The cases in which there was an opportunity of using the warm bath were very limited in number; but, whenever it was used, it proved of great service in removing the spasms, and quieting the patient. After the violent symptoms were subdued, small doses of calomel, combined with opium, were sometimes beneficially administered; and the bowels were kept free by the occasional use of castor oil.

Whether the disease be contagious or not, is a question which has been a good deal agitated. The course pursued by the cholera, from one extremity of India to the other, unchecked by different states of temperature, and by great variation of the

seasons—its travelling, also, against the powerful monsoon winds, and its having been traced moving along the high road from place to place—have been urged as proofs of its contagious nature. The manner in which it was found to have originated, and spread at this place, lends further probability to this opinion. The introduction of the cholera to Bombay has been clearly traced to a person who came from the Deccan, and passed through Panwell when the disorder was raging there; and it has been generally observed here, that whenever it appeared in any particular spot or family, a considerable proportion of its members, or of the people in the neighbourhood, were attacked within a very short period of each other. On many occasions, I have seen three or four of a family lying sick at once. In bringing forward these facts, however, it may be proper to state at the same time, that of the forty-four assistants employed under me, three only were seized with the complaint.

Debility predisposes to an attack of this disease. In Bombay, the poorest classes have suffered most; those who live on meagre food, undergo considerable fatigue, inhabit wretched huts, and who are often obliged, not being possessed of a cot, to sleep on the mud-floor, with scarcely a cloth to

spread under them. Cold and moisture were strong predisposing causes. In the Kamati village, which lies low, and is surrounded, during the rains, with water, the inhabitants are chiefly Hummauls, who are much exposed both day and night. Among these people the disease was most rapid in its progress, and, in proportion, was attended with the greatest mortality. Among the better classes many individuals have been also attacked, but a very small proportion has died where assistance was timely procured. In proportion to its amount, the Mussulman population suffered as much as the Hindoo. In those parts of the native town which are inhabited chiefly by the lower classes of Mussulmans, and of that particular description called Memoms, the cases, on various occasions, were very numerous, and the mortality considerable. The diet and habitations of these Mussulmans differ very little from those of the Hindoos in similar situations in life. The preceding remarks will be considered as wholly applicable to the native population, among whom, from the first appearance of the cholera to the present date, medicine has been administered to 7,459 patients in the districts under my charge. Out of this number, 441 died, which leaves a mortality of nearly six to one hundred.

No. 4.*—The cholera has been in these cantonments since the 18th instant. In the 65th regiment, it commenced on the 21st. The soldiers of this corps, being ignorant of the danger, did not report themselves when they first felt unwell. At the time of their admission into the regimental hospital, the utmost debility was apparent, consisting of feeble pulse and cold extremities, with nausea, and constant vomiting and spasms. These symptoms were followed by universal sinking and coldness of the body. Death ensued in the space of twelve, fourteen, or twenty-one hours after admission. The warm bath, calomel, and opium, were tried, along with the most powerful stimulants, with little advantage.

By the 22nd, when the men had been duly warned of the danger incurred in not reporting themselves early, a different description of cases were received into the hospital. In these patients the skin was hot, the pulse full, and the vomiting constant. Bleeding was used in every case with such success, that I have no hesitation in recommending its adoption. In many the spasms were so violent, that it required six men to hold one

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* G. Burrel, M.D. Seroor, 27th July, 1818.

patient. If relief be not afforded immediately, it is astonishing how soon the patient sinks under the attack. This stage was evinced in the extremities becoming cold, a livid circle appearing round the eyes, and the pulse and the motion of the heart rapidly subsiding.

Every patient who had extensive spasms was bled as soon as admitted, and the bleeding was in general carried to the extent of fainting. He was placed at the same time in a hot bath, the temperature being as high as 110 degrees. In this way the spasms were invariably relieved, and the nausea and vomiting alleviated. The stomach could then bear the exhibition of the calomel, in scruple doses, combined with laudanum; and these doses were frequently repeated. In short, opium, under every modification, was given with calomel; but I believe the calomel will be found to rest on most stomachs even in its simple state. The application of blisters was not attended with much benefit. Blood-letting has my full confidence. Among the Europeans in our hospitals the result was most striking, as it lessened in every case the irritation of the stomach, which is one of the worst symptoms of the disease. Blood-letting has been tried by the native assistants with the same good success.

I am cautious in reporting the cholera not infectious; almost every attendant in the hospital, during the short space of six days, has had the complaint; and there are about thirty attendants attached to the establishment. The regiment is about 800 strong. The admissions from the regiment bear no proportion to the number of the attendants who have been taken sick.

No. 5.*—A stout and apparently healthy Hummaul of Mr. Marriott's, was suddenly attacked with cholera, and from the accounts we received, he appears to have almost immediately become insensible. It is difficult to obtain from a native correct information as to time; but from all I can learn, the attack began two or three hours before he was brought to Mr. Marriott's house. His hands, arms, and feet, were then cold; he had no pulsation at the wrist; when questioned, however, he replied faintly. Mr. Marriott had him placed in a hot bath, and got a vein opened in the arm, which discharged only a small quantity of black blood. It was now that I saw him. While in the bath I opened some other veins, and divided

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* Surgeon Jukes, to the President of the Bombay Medical Board.

both the arteries of the temples, but without effect. No blood could be procured. Brandy, laudanum, and ether, were poured down his throat. In another hour he died.

I have great pleasure in briefly relating another case which happened shortly afterwards at Mr. Marriott's, and where the most complete success attended our exertions.

A stout healthy peon of the collectors, while cleaning his gun in the Chokey, was seized with sudden giddiness, and he fell down insensible. He was carried instantly to the house of Mr. Marriott, who describes him to have been without pulse, and quite insensible. Mr. Marriott, before I arrived, had opened a vein, which now bled very languidly. The patient was completely insensible; there was a slight degree of warmth yet in the extremities, and a very obscure pulsation at the wrist; I immediately opened a fresh vein, and as the blood flowed from the latter, the vein which had ceased to bleed in the other arm, began to pour out the fluid anew. Finding, however, that the blood still came slowly, I punctured a third vein, and had the gratification to behold the regenerated powers, as it were, coming into action, as the blood poured forth from the three veins in full streams. Though perfectly insen-

sible when I first saw him, and his breathing slow and oppressed, his lungs now felt relief, and his breathing gradually improved. Motion perceptibly returned to his eyelids, and when spoken to, though he could not articulate, he comprehended what was said, and made signs that the symptoms were relieved. I allowed the blood to flow, until I think forty ounces had been abstracted. By the time he had become a little restless, and his pulse quick, the arms were bandaged, and he was placed in a hot bath for a few minutes. A copious perspiration appearing, he was removed from the bath, and laid between warm blankets. I confess I have my doubts whether any thing beyond the bath and bleeding would have been necessary to secure this man's recovery; but as it was a severe case, I prescribed, in addition, fifteen grains of calomel, with fifty drops of laudanum, and a proportion of ammonia and peppermint. Three hours after the use of the medicine, his skin was warm and moist, and he only complained of some uneasiness in his stomach, for which a few more drops of laudanum and peppermint were administered with effect. The evacuations in this disease appear invariably to have been destitute of bile, and they resemble rice-water more than any thing else.

Although people of all ages and conditions are liable to be attacked by the prevailing distemper, yet the weak and infirm are its favourite subjects, and undoubtedly suffer most when under the disease. Persons exposed to the inclemency of the weather, as travellers, and people at work in the rice-fields, are greatly predisposed.

It will not have escaped your observation, that the cholera travelled along the high road from the Deccan to Panwell. I have not heard of any village in the Conkan that has received the disease, unless by having had intercourse with the places previously infected. It is worthy of remark, perhaps, that the first person seized here, the 13th of August, was a man who belonged to a detachment which left Seroor on the 28th of July, while the disease was very general there. Several men, also, of the same body, fell ill of cholera during the march, and were sent into Poonah. This detachment, which escorted the state prisoner Trimbuckjee to Tannah, came by water to Panwell, and landed at Chundnee the evening of the 12th of August. It was at Chundnee where the disease first appeared on this island.

I have had no reason, however, to say that the cholera has been contagious at this place. Neither myself nor any of my assistants, who have

been constantly amongst the sick, nor any of the hospital attendants, have had the disease. It has not gone through families here, when one has been affected. In many particulars it is very unlike common contagion. But at present there is considerable obscurity about this singular malady. The laws by which it has been moving from place to place, are very unlike those of the generality of epidemics.

If the exciting cause be something in the atmosphere, which has exercised its influence from Bengal to the Deccan, how did it come directly against the south-west wind that has been blowing upon this coast since June? How does it happen that the winds from the ocean still spread the disease? And if it be something general in the atmosphere, why has it not hitherto made its appearance in some two distinct parts of the province at the same time? Nothing of this kind has, I believe, been observed. It still seems to be creeping from village to village, extends for a few days, and then begins to decline.

In order to afford you every information in my power, I will just add, that, to common observation, there has not been any thing peculiar in the weather. The barometer has not been either remarkably high or low. The thermometer, for

the last month, has scarcely ranged more than from 76 to 82 degrees; and during many days has been nearly stationary at 78 or 79 degrees.

No. 6.*—I am sorry that I cannot add much to your stock of information respecting the singular and interesting epidemic with which India is visited. I was absent on a tour into Candeish with Mr. Elphinstone during its prevalence here, and my experience is confined to the cases that occurred in our camp.

Our escort consisted of four companies of Sepoys and fifty irregular horse. Several native gentlemen, with their followers, accompanied us, which increased our party to about 1,200 persons.

We left Poonah towards the end of June, and, after halting about ten days at Ahmednuggur, which was quite healthy, we arrived at Toka on the 13th of July. During this part of our journey, the wind blew an almost constant gale from the westward, and, beyond a shower or two, no rain fell. We were visited at Toka by a gentleman from Aurungabad, who informed us that the cholera was raging in that city, and that, accord-

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* Surgeon Coats, to the President of the Medical Board, Bombay.

ing to the prevalent opinion, it had been brought from Jaulnah, where it still existed. Moreover, that its progress through the villages, and along the post-road from Nagpore to that station, could be distinctly traced. The treatment chiefly consisted in the use of calomel and opium, and it had been particularly successful.

We arrived on the 19th in Colonel McDowall's camp, in Candeish, where the cholera prevailed; and the gentlemen generally believed that it had been introduced among them from Jaulnah, with which there was a constant communication. It did not appear that the disease existed in any of the neighbouring villages. Some Europeans had been attacked; and of the five persons so circumstanced, four died. Twelve cases had occurred among the natives; but the mortality was less than that of the former. Calomel and opium were fully tried on the Europeans; and, in the opinion of the gentlemen who adopted this practice, it rather seemed to aggravate than allay the symptoms. I do not recollect if the patients were bled, but I am inclined to think not. We took our position in the centre of Colonel McDowall's camp, and remained one day, exclusive of that of our arrival; and our people and his must have mixed with each other. The day after leaving

Colonel McDowall's camp, one of our Sepoys was attacked on the march with the usual symptoms of cholera. He was in the rear at the time, and I did not see him until we came to our ground. The native assistant, however, gave him a dose of fifty drops of laudanum, and put him into a vehicle. When I saw him his extremities were cold, his pulse at the wrist scarcely to be felt, his countenance had the peculiar appearance expressive of the disease, and, although he did not complain much, he was very restless, and rolled about in his bed. I gave him twenty grains of calomel, and fifty drops of laudanum, with peppermint, and ordered him fomentations and frictions. He now became quiet; but there was no tendency to sleep, and the pulse did not improve for several hours. At length the pulse began to return; and a dose of castor oil and laudanum was given, which operated well, and the symptoms subsided. Several days elapsed before the patient recovered his strength.

We continued our journey through Candeish, &c., to Chandore, without having had any other patients, or meeting with the disease in any of the villages. A few days before we left Songeer, the cholera had reached some villages to the eastward. I was not able to trace by what route. It also

raged in Sir John Malcolm's camp at Mhow, in the Nerbuddah. We arrived at Chandore on the 16th of August. A great change of climate was experienced on passing the Ghaut at Chandore; the thermometer fell ten degrees, and the air had the coolness and elasticity of that of Poonah, instead of the moist feel of that of Candeish. Daily showers fell during the remainder of our journey; and occasionally the rain was heavy, which made travelling rather harassing to our followers. The cholera had reached Chandore before us, and there were a few cases in the town during our stay; but it had not been violent, nor had it excited much alarm. A communication had been kept up between this post and Colonel McDowall's camp. In the evening of the day after we had left Chandore, the servant of one of the Brahmins of our camp was attacked, and he was brought to me about three o'clock in the morning. He was not then suffering much from either spasms or vomiting, and his master had given him a dose of opium. I ordered him twenty grains of calomel and forty drops of laudanum, warmth, &c. At daylight a report was brought that he was better, and that he had been sent forward on a camel. When we came to our ground, his pulse was scarcely to be felt, and his extremities were

cold. Another dose of the medicine was given, and frictions and fomentations ordered. He seemed to rally a little afterwards, but died in the course of the evening.

We arrived at Nassick the 21st of August, halted during the 22nd, and left it on the 23rd. The cholera had been raging there severely, and three hundred persons were supposed to have been destroyed. During our stay, though the disease was said to be rather on the decline, fresh cases were hourly occurring. Some of the Brahmins informed me, without their being particularly asked, that the disease had been brought by some individuals from Ahmednuggur. The town of Nassick is situated rather low, and sheltered from strong north winds; the streets are narrow and dirty, and generally slope towards the Godavery river, near which a tank is built. Our troops were cantoned to the north-west of the tank, at a distance of a few hundred yards, on an elevated, dry, and exposed spot. A free communication was kept up with the town; but no case of cholera happened to the troops or followers during our short stay. The day after we left Nassick, however, a follower of one of the Vakeels was seized, and, the next day, two more were taken ill. The number of cases increased daily till the

28th; after which, they gradually decreased till the 3rd of September. From this date, no new instance was recorded. The whole number of the persons affected amounted to thirty-two or thirty-three, and the proportion of deaths was seven.

From the above facts, and others which have been related, I am led to consider the disease infectious. Taking this opinion, however, to be well founded, it ought not to occasion much alarm, for it is only under some peculiarity of constitution the poison is enabled to act, and that peculiarity is fortunately very limited. In our camp, about one in forty was infected; and I believe this is above the common proportion. If the disease were occasioned merely by a distempered state of the atmosphere, it would have spread over the country with some regularity. The cholera, on the contrary, seems generally to have travelled in lines along the post-roads, and has almost required a succession of subjects for its propagation. In Candeish, where the population is scanty, and little intercourse maintained among the villages, the progress of cholera was slow. At Punderpoor, the disease made its appearance at the time of the great Jatra festival, and was spread at once in every direction by the pilgrims returning to their homes. The poison, also, seems to have been

more concentrated there, from the presence of so many sources of production. The number of deaths in a few days was estimated at three thousand; and the patients are described to have been knocked down dead, as if by lightning.

In the treatment, I think, calomel should be generally employed, but, regarding Europeans, not until the patients have been freely bled; and, in both Europeans and natives, not until the irritation of the stomach has been removed by laudanum. It does not appear to me that there is any necessity for such large doses as twenty grains of calomel. The laudanum or opium, moreover, should not be pushed beyond the quantity required to check the vomiting or purging, and to allay the pains and the cramps. The opiates did not produce healthy sleep in any of my patients. A sort of stupor or lethargy followed its administration in large doses. I had recourse to bleeding with the most beneficial effect. Blood-letting should never be omitted in the treatment of Europeans, and young robust natives—and, indeed, generally, unless the persons are very old, or very far advanced in the disease. In many instances, notwithstanding the use of the above remedies, there was a considerable struggle, and it was some time before the healthy reaction

took place. In such cases, I always employed friction and fomentations. The patient was allowed to drink sparingly of warm rice-water; and to this was added, if he did not quickly revive, a little brandy, or draughts containing hartshorn. The instant the skin became warm, I administered a dose of castor oil and laudanum, which usually operated, and then I considered all danger removed. No disease that I have seen requires more attention on the part of the physician.

No. 7.*—In cholera, the pulse is generally very feeble and small, and in many cases it is scarcely perceptible, or not to be felt at the wrist, even from the first attack. There is often great pain and sensation of burning heat at the pit of the stomach, the skin is covered with clammy perspiration, the eyes sunken, and the breathing oppressed. In some cases there is great restlessness and anxiety. In others the diminution of strength is such that the patients are unable to move. They lie prostrate on the cot, as if dead. It is possible, however, to rouse them from this state of apparent insensibility, and then they make replies as long as the tongue can give utterance.

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* Charles Daw, Surgeon, Aurungabad, July 29, 1818.

After articulation, indeed, has become impossible, they make signs which shew that the mind remains unimpaired to the last. At an early period, a most distressing thirst prevails, and the patients are particularly anxious for cold water, in preference to every thing else. Should this urgent desire be indulged, it will render the chance of recovery almost hopeless.

Europeans become predisposed to the disease through intemperance, and more certainly if they expose themselves in a state of intoxication to the night air, or fall asleep in an open place. The fatigue and exposure to which the natives are subject, together with a deficiency of clothing, bad food, the eating of cold fruits, as melons, cucumbers, raw vegetables, &c. evidently lay them open to sickness, and never fail in producing more or less of fever and bowel complaints at this season of the year. But now, these common affections are much fewer in number than is usual, and the cholera has instead been the prevailing distemper.

The following is an illustration of what care and temperance can perform, in the way of preserving Europeans from the attacks of the cholera. Two bodies of men, one amounting to 300, the other to 100 persons, were located in adjoining

situations when the cholera arrived. The smaller body immediately determined to live temperately, and, by avoiding the night air, and the other predisposing circumstances, which were obvious, to endeavour to escape the distemper. The plan succeeded so well, that only one individual was seized of the one hundred. The larger body adopted no precaution: they lived in their usual way, and one tenth of their whole number perished.

No. 8.*—We had been upon the look-out for the attack of cholera upwards of a month, and every precaution was used, and strict orders given, the moment a man was taken ill in the lines, by day or by night, that he should be brought to me. The first two cases commenced during the night, and notwithstanding the previous order, they remained in the lines, through their own obstinacy, until morning. At this time the advance of the disease rendered every remedial effort ineffectual. In one of them, an old man, the incipient symptoms were so mild that they did not attract the notice of the persons who were in the tent. The other patient was of a sickly habit,

* Surgeon Robertson, Camp at Keerky, Aug. 31, 1818.

and subject to occasional attacks of fever, which enabled him to deceive his serjeant—who was about to bring him to me—into the belief that there was little the matter.

The disease displays great variety in its mode of attack, which is certainly influenced by the constitution of the subject. Parts, also, that have been previously weakened by bad health, sometimes give rise to particular symptoms. Thus, among the admissions into hospital, I observed some men, who had been exposed to the causes of fever, were seized with a cold, shivering fit, and great weakness, they said, such as they had never felt before; and occasionally they complained of loss of sight. These symptoms were succeeded, in a short time, by a hot skin, quick and tolerably full pulse, acute headache, intense thirst, sickness, tendency to spasmodic twitchings, and sometimes vomiting, without their bowels being much affected.

A man, who had been subject to epilepsy, was heard at night, by the serjeant, moaning and grinding his teeth, in his sleep. The serjeant awoke him, and he instantly began to vomit. He was brought to me in a state of insensibility. Being roused with smelling salts, the vomiting again returned, and he immediately burst into

tears. He now complained of an unaccountable oppression of the chest, intense headache, and thirst. A dose of calomel and laudanum were administered, after which he fell into a sound sleep, and was quite well next morning.

No. 9.*—Several people, seized with cholera in the bazaar fields, have suddenly become giddy, fallen down, and after one or two slight efforts to vomit, have expired.

Blood-letting must be performed early in the disease. In the latter stages, blood will not flow in any quantity, even from the jugular veins, or temporal arteries. Indeed, after the pulse has failed at the wrist, and the extremities have become cold, I consider the patient as almost irrecoverable.

I have had eleven cases of cholera: I bled the whole of them, some very largely, and then adopted the usual medical treatment. I am perfectly convinced that nothing but the bleeding could have saved the lives of three of them; and it has not been injurious in any. It was quite gratifying to hear some of them say, while the

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* Surgeon Gordon, Satara, 20th August, 1818.

blood was flowing, "The pain in the head is gone;" then, "The burning heat in the bowels is also gone;" and next, "The cramps have also ceased." If the patient is not brought very soon after the attack, the blood sometimes comes away, at first, only in drops; but after a little has escaped, the patient yawns, or takes two or three full inspirations, and then the blood flows in a stream.

In one case I opened a vein in the arm, but the blood would not flow. I tried the jugular vein, also, without much effect. I then punctured the temporal artery, which bled tolerably free. After a few ounces escaped, the circulation had so far recovered, that the blood began to flow from the jugular vein, and by placing the ligature again on the arm, the fluid came from it also, in a full stream. The pulse always rises, under the loss of blood, and the heat returns to the extremities as the circulation returns.

If the disease is so advanced that blood will not flow, even when the patient is placed in the hot bath, the case is desperate. Life may continue for many hours, and every symptom, save debility, may subside, yet nothing will rouse the circulation again.

No. 10.*—It may be proper to mention, that laudanum, in a large dose of sixty drops, is not a stimulant, but a sedative; whereas, in quantities of from fifteen to thirty drops, it has generally a stimulant effect alone. The former induces sound sleep, removes spasm and irritability; whilst the latter excites considerable uneasiness and convulsive startings. The variation of a dose of calomel has a similar influence. Calomel, when taken in a small dose, is followed by lassitude, sickness, irritation of the bowels, and purging; but in quantities amounting to fifteen or twenty grains, it has a sedative power. In large doses, it allays vomiting, removes spasm, sends the patient to sleep, and produces moderate action in the bowels.

You will now perceive the principle by which I was guided in the treatment of my patients labouring under cholera. My plan is not that of giving powerful stimulants; it is one which rapidly removes the spasms and irritability, composes the stomach and the bowels, invites sleep and tranquillity of mind, promotes the secretions of the liver, and opposes an inflammatory tendency. On the second day, it was indeed a consolatory sight to observe the wonderful change in the

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* Frederick Corbyn, Surgeon, Camp Eritch, Nov. 26, 1817.

character of the malady. The vomiting had ceased, the spasms were removed, the patient had experienced sound sleep, and the pulse had returned to the wrist.

In the treatment of Europeans, however, I should strongly recommend copious blood-letting; and a mixture, containing in one dose never less than twenty grains of calomel, sixty drops of laudanum, and twenty drops of peppermint, which may be administered in two ounces of water. Should the blood not flow, immersion in a warm bath will have a most beneficial effect. When the evacuations are incessant as well as violent, we should not be afraid of giving eighty drops of laudanum, with the twenty grains of calomel, and using at the same time an enema, containing forty drops of laudanum. A few hours determine the fate of the patient, and these should not be lost by inactivity.

In the course of three or four hours, when the first shock is over, if much spasm and irritability remain, the dose of calomel and laudanum must be repeated; the patient will then, probably, fall into a sound sleep, and awaken, in some time, nearly recovered. The after-treatment will consist in keeping the bowels regular, and in giving some laudanum, to promote sleep. Bleeding, it

should be remarked, is not adapted to old persons, who are weak, or worn down by disease. Among the most urgent symptoms are the dreadful sensation of heat in the bowels and at the pit of the stomach, and violent thirst. The frequent and lamentable calls for water should never be indulged, for I observed many of the camp-followers who perished in the act of drinking. I allowed the patients to relieve their thirst with warm rice-water, and sentries were stationed at the hospital to prevent the introduction of common water.

I am of opinion, that unless the remedies are resorted to within six hours after the attack, the case is almost hopeless; at least, I recovered only ten patients in the regular form of the disease, after a considerable lapse of time; and in these the symptoms were moderate.

It is of the greatest importance to bear in mind that the calomel should be administered in *powder*. Many instances were observed, in which calomel *pills* passed through the system in the same state as when they entered the stomach; for the same reason, laudanum is in general preferred to solid opium. The action of pills is necessarily slow, as they have to dissolve in the first place, and if they happen to pass without undergoing this process, no benefit whatever is derived.

No. 11.*—The practice I pursued, in the management of cholera, was that in which large doses of calomel formed the sheet-anchor. I have had the most manifest proof, both in this disease, and, formerly, in the treatment of fever and dysentery, that calomel, in doses of fifteen or twenty grains, acts as a powerful sedative. It often allays vomiting, and removes uneasy sensations, when no other medicine will produce such beneficial results. I have always combined the calomel with either laudanum or the extract of opium, and usually added a few drops of the essential oil of peppermint to the preparation. Very often, however, the peppermint and laudanum seemed to increase the vomiting, in which case, after waiting a little, or after the application of the warm bath, the dose of calomel was repeated, in combination with the extract of opium and honey, or conserve. If the calomel and laudanum are rejected soon after their administration, without having produced any benefit, we must, in the course of a short time, always repeat them. The quantity of the medicine given in this way is of little importance; we should be guided by its effects upon the symptoms. In the mean time, it will be proper

* Thomas Whyte, Surgeon, Seroor, July 28th, 1818.

to prevent the patient from taking any thing into his stomach which has not been prescribed. The calls for cold drinks are constant, and if gratified, they will counteract every remedy, causing the vomiting, spasms, and other bad symptoms, to return in their original violence.

No. 12.*—In most cases of cholera, I have succeeded in arresting the vomiting and purging by the use of large doses of calomel and laudanum. It has been necessary, however, in almost every instance, to repeat the medicines, in order to allay the pain and spasms of the bowels. When this is accomplished, the coldness and the debility remain to be conquered, for which the most active stimulants are necessary. I have begun to prescribe arrack (spirits) in hot water, to the natives, for they are too numerous to be supplied with harts-horn, ether, &c. The coldness and debility have in some cases continued for twelve hours, when the favourable prognostics of heat and moisture gradually returned to the skin.

The disease has attacked the European soldiers in the 65th regiment, and in the artillery. To-day five of the former, and ten of the latter, are

* Surgeon Wallace, Seroor, July, 1818.

affected. The symptoms are extremely formidable, and the prominent feature here, as in the natives, is the great and alarming debility. The same treatment has been found applicable to both. The hot bath has been very benefical among the Europeans, and I shall endeavour, in the course of the day, to extend its advantages to the natives.

The preceding treatment is very efficacious when adopted early; but the majority of the patients do not apply for relief until after some hours have elapsed. Then the medicine, in common with every other liquid, is almost invariably rejected by the stomach. To obviate this, I blended two grains of soft opium and fifteen grains of calomel with two tea-spoonfuls of honey, which was dropped into the patient's mouth, and, being swallowed, was often retained. The use of the hot bath followed, and the patient was ordered to drink some arrack, mixed with hot water, spices, and sugar.

When the medicine was obstinately rejected in every shape, the patient has been placed in the hot bath, and bled with evident advantage. The blood should be permitted to flow until the contractions of the muscles are subdued. At this period the stomach will frequently retain the medicine, and a favourable effect may succeed to its use before the recurrence of spasms. Should these symptoms

return, the bath must be tried again. A second bleeding, also, is sometimes required. We are engaged in a melancholy duty, and I fear the malady will spread over all the western provinces.

No. 13.*—In many cases of cholera the primary symptoms are not uniform. In several, the vomiting and purging did not commence for some time; and in two instances which came under my notice, neither of these symptoms were present. The spasms, however, pain in the bowels, and great prostration of strength, which almost invariably marked the disease, were very severe. Fainting was sometimes a primary symptom. In one case the sudden debility was strongly marked. A carpenter, while at work, fell down in a state of motionless insensibility. He was roused with some difficulty, and then the common symptoms became developed in so violent a manner, that he was carried off in spite of the medical aid which had been immediately procured.

No. 14.†—The cholera had prevailed among the inhabitants of Nagpore, and the neighbouring villages, from the middle of May. It was attended

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* Surgeon Henderson, Kurrar, August 14, 1818.

† John Wylie, Surgeon, Camp Nagpore, July 20, 1818.

with great mortality, and was generally diffused among the citizens, with whom the Sepoys had daily intercourse. No case, however, occurred among the troops before the 26th or 27th of the month, when three or four men of the depôt corps were attacked, and fell victims. On the 30th, the detachment which had been engaged in the siege of Chandah, returned to this place, and re-occupied their lines near the Setabuldee Hills. Previously to our return from Chandah, notwithstanding the excessive heat of the weather and the laborious duties of the siege, we had hitherto been tolerably healthy, and had not seen a single case of the genuine cholera. We had scarcely, however, taken possession of our lines, when the cholera, like a plague, fell on the Bengal troops and followers. The havoc was dreadful. Our Madras Sepoys and followers passed this day with impunity, save in the solitary instance of a man who had been wounded in the assault of Chandah. He had nearly recovered of his wounds, but scarcely had he arrived here when he was attacked by the cholera. The troops that had escaped during the 30th paid dearly on the 31st. This day was marked with the signs of mourning and lamentation. The disease had spread throughout the camp, and of all attacked at this time the greater proportion died. During

the 1st of June the number seized was very great, but fortunately the proportion of deaths had greatly diminished. During the 2nd there were not so many new cases, and on the 3rd and 4th they were still fewer. After the 5th the number admitted into hospital was comparatively trifling, and although the disease still continued to shew itself, it ceased to spread to any extent.

In regard to the general history of this disease among the inhabitants of the country, I am but very ill informed. From what I have learned, however, it would seem to have come from the north-east, and to have advanced gradually in a south-westerly direction, taking Nagpore in its course, and committing the most terrible ravages. It would appear to be confined to a certain tract of country, and, if this is the case, the origin of the malady must be connected with a peculiar morbific poison in the atmosphere of that tract, rather than with contagion, or with any general atmospheric cause. Better accounts, however, of its locality and progress are required before that point can be settled with certainty.

No. 15.*—I am extremely happy to have it in my power to bear testimony, in the strongest

* R. Orton, Surgeon, Bellary, Oct. 8, 1818.

terms, to the efficacy of blood-letting in the treatment of cholera. In four cases it failed, but in all of these the severe symptoms had been established, from five to thirteen hours before admission. In thirty-two others I have seen bleeding followed by rapid cures, though in fifteen of these the second stage had commenced. In none has it been unsuccessful when applied before or soon after the commencement of that stage.

Dreadful as this disease will prove, if neglected, it happily seldom omits, like the rattle-snake, to give us a salutary warning of its approach. It is an object of the first importance that these warning symptoms should be generally known, impressed upon the memory, and attended to. In almost every case the cholera commences with anxiety, lassitude, and giddiness. To the hand of another person the patient's skin feels moister and colder than natural. The pulse is usually quick and weak. Sickness and uneasiness at the stomach are complained of. The bowels are griped, and evacuations succeed. If these symptoms are neglected, a new train more peculiar to cholera are sure to set in—great debility, thirst, burning pain at stomach, constant evacuations, spasms, &c. If the remedies are still untried, the pulse sinks so as scarcely to be felt, and the patient tosses

about in an agonized state. In three or four hours the disease has gained such ground, that human efforts are generally unable to check its deadly course. In some cases, nearly in this state, I have seen bleeding succeed; but in two others, it appeared to hasten the catastrophe.

The chance of success in the treatment of the malady depends much upon the progress which it has made when we happen to be called in; but few, at least of the actual sufferers, are sufficiently impressed with the vital importance of attention to this point. The severe variety of the disease seems to have a tendency to run on progressively to death, unless interrupted by art. If taken in time, however, the cholera is probably more under the controul of medicine than any other dangerous malady. Almost all the fatal cases in the last attack, in the 34th regiment, were very considerably advanced before they came to hospital, and the deaths of a number of them may be fairly ascribed to that circumstance. Soldiers are usually so careless and stupid, that it is very difficult to get them early to the hospital.

The weather had been extremely clear for a long time before the disease appeared in the 34th regiment. The first cases happened during the evening of the 14th of May, and on the following

morning the weather became cloudy, and it continued extremely so for three days. About the same time, the land-wind set in with great force, and remained for several days without abatement. As it appeared, from former accounts, that these winds had exercised a beneficial effect over the cholera, I was in hopes that they would now check its progress; but it continued to increase apparently uninfluenced by them. We had only two or three slight showers of rain while the malady prevailed. There was, however, much promise of rain to the westward; and I was informed that a heavy storm, with rain, had happened at Arcot. According to the newspapers, there was much stormy weather in the Bay during the month. I was informed, also, that a violent squall, with rain, was experienced in the camp of the 53rd regiment about the time the cholera had commenced its attack.

No. 16.*—Under our present knowledge of cholera, I shall not offer any particular observations regarding its exciting cause. The opinion, however, that it entirely depends on a morbific

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* A. Connell, Staff-surgeon, Secunderabad, September 26, 1818.

state of the atmosphere, is encumbered with many difficulties. For example, this malady, unlike other epidemics, has proceeded slowly over the country. It has followed, also, the routes most frequented by human beings, in direct opposition to the course of the winds. I am unable, indeed, to say, that it has never appeared in one place until after the arrival of individuals from another where the malady had prevailed; but, at first, its attacks are certainly confined to particular spots in the towns and stations which are subjected to its invasion. When the cholera raged in the Residency, and in the Begum Bazaar, near the city of Hyderabad, many days elapsed before it reached the Cantonment—a distance of only five miles. The city is only separated from the Bazaar by the river Moosa; yet the disease took some days to extend from the Bazaar to the city. The first cases that occurred in the Cantonment were among the Sepoys, who had returned from performing duty at the Residency. The different corps were afterwards attacked in succession. It will be difficult to reconcile these facts to the opinion which ascribes the disease solely to atmospheric influence. If the cholera were propagated by the atmosphere, we should expect that its progress would be more rapid, and that it

would spread in a more general manner. I am unable, however, to give an individual case where I could positively say that the disease arose from contagion.

No. 17.*—The cholera first appeared amongst the inhabitants of this place immediately after the departure of the 1st battalion of the 16th regiment, amongst whom it had been raging during their march from Hyderabad, and during their three days' continuance at this station. The disease had existed under its worst and most fatal form. All the powers of life sank rapidly, without much previous vomiting, purging, or spasm. In this form, also, it has remained with us; and, without venturing to give an opinion of the manner, it has evidently been left with us by the above body of troops. There has been nothing uncommon in the state of the weather, neither immediately preceding, nor since the appearance of cholera at this station.

Amongst the Sepoys who have come under my charge, the mortality has been very extensive, owing, in a great degree, to their delay in reporting themselves, as well as to the violent form of

* W. Train, Surgeon, Ghooty, February, 1820.

the disease. In an hour or two, they have often been reduced to a state of helpless exhaustion, from which the constitution could not be roused; or if, after the exhibition of medicine, a feeble attempt at reaction were evinced, the patients, in general, have sunk quickly into a state of greater weakness than before.

The practice I have followed has been bleeding in every case where blood could be procured. Most patients recover from whom a quantity of blood can be obtained. Frequently, however, on opening a vein, the fluid comes away only in drops, and even the most powerful stimulants fail in exciting the circulation. I have, in two or three instances, opened the temporal artery without any better result. The natives, moreover, having strong prejudices against blood-letting, and other remedies employed in this disease, kept away from the hospital as long as they could. Argument has no influence in removing these unfortunate peculiarities; and I have often observed, that a patient suffering from cholera regards neither soothing language nor the greatest attention. Their prejudices, also, have an evil effect beyond the immediate victims. The patients who come late, and consequently die in hospital,

leave an impression on the mind of the other natives that medicine has no control over the malady.

The general treatment has consisted in giving, as soon as the case is admitted, a draught of laudanum, with camphor, or hartshorn and peppermint, in hot arrack. Frictions, universal and partial, have been employed; mustard-poultices to the feet and hands, and heat to the limbs. Whenever there was irritability of stomach, a blister was applied over the part; and, in several instances where the vomiting has been excessive, I have produced erosion of the skin with the nitric acid prior to the application of the blister. The draughts were repeated according to circumstances. I tried the warm bath on one man. He was much exhausted, the circulation languid, and extremities cold. I think he would have lingered some hours in that state, if he had been left alone; but, on putting him into a vessel of hot water, he immediately gave a shriek, and expired. A similar instance happened at Chittledroog; and I am quite convinced that the application of so general a stimulus as the hot bath is detrimental to patients in the last stage of cholera. In the commencement of the disease, the hot bath may

prove serviceable, like all other active remedies; but the exhausted constitution cannot bear its effect.

Several circumstances have occurred during the attacks at this station tending to prove the disease contagious. Great numbers of men who have been waiting on their sick friends were lately attacked. It has generally happened that one person in a family having been seized, others in the same house have afterwards almost immediately sickened.

No. 18.*—The treatment of cholera among the native inhabitants has been very successful. Where medical aid has been resorted to in any reasonable time, scarcely a single fatal case has occurred. Out of 292 patients, fourteen only have died, and these were persons who had been suffered to remain at their homes until the usual remedies were ineffectual. It is very distressing to observe the amazing apathy which pervades a very great proportion of the infatuated people. Numbers of them, who rejected the means that have preserved so many of their fellow-creatures, have fallen victims to their obstinacy. Expedients

* J. Cother, Surgeon, Ramnad, Jan. 1819.

have been exhausted in endeavouring to convince them of their folly, and without effect. Vytians and Hakeems, of different castes and respectability, have been instructed and supplied with medicines to administer to the sick at their own homes; yet this plan has been attended with little comparative advantage. In the fort of Ramnad alone, eight or ten are now dying daily. In the populous villages of the districts, the same unhappy circumstances have been observed. Until a large share had paid the forfeiture of life, the inhabitants would not resort to the use of the medicine which the benevolence of government so liberally affords. On a tour lately through a diseased neighbourhood, I saw the melancholy fact exemplified in almost every village; and in one, where a great many persons had died, the survivors still refused the proffered assistance. Such is the prejudice of this darkly ignorant, and bigoted race!

No. 19.*—The cholera continued here from the 5th to the 20th of January. It increased for three weeks, and subsided in the fourth. During that period, thirty-one Sepoys were attacked. The

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* Surgeon Mitchell, Palamcottah, Feb. 1819.

natives in the Fort were affected a day or two before the Sepoys; and, two or three days before the disease entered the Fort, it was prevalent in Walnaud, a village ten miles distant. As far as I can learn, the cholera appears to have made its approaches by neither of the great roads; it is, therefore, difficult to determine whether we had the disease from Madura or Ramnad. Commencing its ravages here to the eastward, and a little north of the Fort, it spread pretty generally through the small, low, dirty houses, in every direction. The hospital seems to have escaped, probably because the building stood upon high and open ground. None of the inmates were seized. One of the orderlies, indeed, fell a victim; but nothing can be inferred from his case, as he was in the habit of absenting himself from the hospital at night.

It strikes me that the cholera must have been propagated through the atmosphere, much in the same way as intermittent and remittent fever. When cholera was most virulent, the weather was close and sultry, and during the day the sun was obscured by whitish clouds. Had contagion been concerned in the production of cholera, we should have looked for it in the direction of the roads. We should, also, have expected to meet it in our

hospital; as, at first, I was obliged, for want of room, to put the cholera cases among the other sick.

No. 20.*—The patient labouring under cholera frequently sinks on being taken out of the warm bath. Placing the patient in an erect position—an act more or less necessary while removing him from his cot to the bath—is often attended with a fainting fit, from which he sometimes does not recover. Most patients have an unconquerable aversion to the warm bath. I have known many, who were apparently in a state of stupor at the time, roar out with horror at the dread of immersion. Patients, generally, let the surface of their bodies be ever so cold, appear intolerant of the application of external heat in any form. In its use, therefore, we should carefully avoid interfering with sleep, which is of all things the most desirable. Heated sand or ashes may be included in a soft cloth, and applied in the gentlest manner all over the surface.

Travellers, on all occasions, appear to be more obnoxious to the attack of this disease than residents. They seem capable of carrying with them

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* J. Chalmers, Surgeon, Tinnevelly, May 21, 1820.

to a considerable distance, a sort of infected cholera atmosphere, which is at times liable to affect themselves, or those near them. Thus far it may be said to be contagious; but that again seems to depend more on predisposition than does any other contagion with which we are acquainted.

Treatment.

1. I bleed freely, if possible.
2. Give twenty or twenty-five grains of calomel, and wash it down with sixty drops of laudanum.
3. Should this be rejected, a dose of sulphuric ether.
4. And, again, the calomel and laudanum, if necessary.
5. Counter-irritants to the region of the stomach.
6. Heated sand, or ashes, in a soft cloth, to be applied gently to the limbs and surface of the body.
7. Anodyne enemas, if indicated.
8. When the patient awakes from his first nap, a smart purgative of jalap or aloes.
9. If the spasms have been severe, camphor and opium every two hours during their continuance.

10. For drink, the patient has, at first, warm rice-water, with ginger or spirits; afterwards, mulligatawney.

No. 21.*—Many persons suffering from cholera have been picked up in the streets in a dying state, and all of these eventually perished. Some died in the vapour bath. Such failures, however, should not bring our remedies into disgrace. Poor destitute wretches, who probably partook of no food for some days before they were attacked, and whom we were obliged to support while they lived, form the largest portion of our casualties. The disease did not extend itself as we had reason to apprehend. It first appeared among the Christians, who were glad of our medical aid; and then it extended to the Mapilas. These people still suffer, but they perseveringly refuse all foreign assistance. Their losses cannot be ascertained, on account of the secrecy of their modes of life, and their particular prejudices.

No. 22.†—It may be proper to mention a very singular occurrence which I lately witnessed.

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* J. Wyse, Surgeon, Cannanore, January 24th, 1819.

† Surgeon Mather, Cochin, January 1st, 1819.

One of the victims of the prevailing deadly pest had terminated his existence with so little effort, that the last moment was not perceptible either to myself or to any of the bystanders. The peculiar fixed appearance, however, of the eyes and countenance soon rendered the fatal event sufficiently obvious; the face was covered, and in a few minutes I went home. In half an hour a hasty message arrived, to inform me that motion had been perceived in a foot of the deceased. I considered it a mere illusion; but on my return, motion was clearly perceptible in one of the feet, and also in a hand; grasping the arm, an obscurely tremulous motion was felt pervading its muscles. Though the face and neck were stiff and cold, there was considerable warmth in the trunk, particularly about the chest. I immediately opened a vein in both arms. About half an ounce of dark, half-coagulated blood, flowed from that in the left, after which there was sufficient action in the right arm to bend slightly the fore-arm. As the last act of duty, the body was placed on the steaming cot, and the result was what I expected.

No. 23.*—The cholera appeared, the 18th July, in the camp of the Mysore Silledar Horse, while

* G. Bucke, Surgeon, Deccan, August 2nd, 1818.

encamped on the north bank of the Godavery. The sudden and great prostration of strength which the patients experienced, exceeded any thing that I could have imagined. It was not unusual for a Silledar to arrive at the ground of encampment in perfect health, be attacked with the disease, and in an hour become so weak as to be totally incapable of the least exertion, even that of sitting upright. Spasm in the muscles of the belly, thighs, legs, and arms, was almost a constant symptom, and the agony was dreadfully severe. The intervals of pain were exceedingly short, and the suffering consequently nearly continued, unless relieved by internal medicines, or the warmth of fomentations. If, in any case, spasm were absent, a burning pain was complained of at the pit of the stomach. The eyes were generally dull and heavy, and covered with a glutinous film; for a short time before death, they remained insensible to the impression of light. The tongue was covered with a brown slimy crust, and in no instance did it appear clean. Headache was only an occasional symptom. The thirst was excessive, with a strong desire for cold liquids, the use of which would have proved highly injurious. In one case alone was the heat of the skin above the natural tem-

perature; in every other it was below, and frequently covered, after a fit of spasm, with cold, clammy perspiration.

No. 24.*—Twenty-nine men of his Majesty's 84th regiment were admitted with cholera last month, of whom five died. Of the European artillery, eight were admitted; and one man, a serjeant, died. There have been many women attacked, European and native, belonging to the soldiers in the Fort; but few children have been subjected to the disease. In the European and Sepoy hospitals, I have observed that the malady more generally attacks elderly people rather than the young; and this, I am told, is also the case among the native inhabitants.

The cholera has now reached Ghooty, and is travelling along the high road to Cuddapal and Madras. There is much difference of opinion here as to whether the malady is infectious.—*Causa latet, vis est notissima.*—There is one fact certain, that his Majesty's 34th regiment carried it with them from Bellary to Nundydroog, and that there was no trace of the disease in the

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* J. Duncan, Surgeon, Bellary, Oct. 13th, 1818.

villages on the road. Since the regiment passed, every village on this road has been invaded.

No. 25.*—If I were to act discretionally, in the event of a second visitation of the cholera, I would use the lancet in very many instances, and the subsequent treatment would be guided according to the degree of spasms or other urgent symptoms. Immediately after bleeding, the patient should be placed in the vapour bath. As far as my experience goes, the vapour bath is far superior to the common warm bath; for in the former the patient is not exhausted; whereas, immersion in the latter, even during five minutes, increases the debility. The patient may remain in the vapour bath from twenty to fifty minutes. The inhalation of the steam is beneficial, as the warmth is imparted in this way directly to the lungs.

No. 26.†—The poorer classes seem to suffer most from cholera; the Mohammedans in a greater proportion than the Hindoos—and of these, the Pariah more than any other caste. Very few, comparatively, were attacked among the half-

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* Sir T. Sevestre, K. T., Surgeon, Madras, Dec. 25, 1818.

† Surgeon P. Scott, M. D., Madras, March 31, 1819.

caste population. Of the trades and occupations, the oilmongers, cowkeepers and washermen, and the boatmen, seemed most liable. Of the sexes, the males rather exceeded the number of the females; and the old of both, rather than the young. Indeed, I am inclined to think that a large proportion of cases occurred amongst such as had arrived about the middle and at an advanced period of life; and amongst such as were infirm, and of a spare and delicate constitution.

Neither pregnant women nor infants seem to be exempt from its attacks; but instances of the latter were exceedingly rare. The disease has been observed, I believe, to be less violent on the sea-coast than in the interior; and the total number of deaths at Madras is, proportionably, much less than has occurred at inland stations.

I ascertained that a great many persons were seized under circumstances of exposure at night, or of a certain predisposition of body; many, after intemperance, fatigue, or any sudden exhaustion—a state which evidently seemed, from whatever cause it was produced, to render the body more susceptible of the morbid impressions. Instances of this were seen in individuals who were almost immediately attacked on their arrival at Madras, after a long and fatiguing journey. Very few of

the lower castes escaped who were given to intoxication, and slept exposed to the night air.

By far the greater number of persons were seized suddenly between five and seven o'clock in the morning, or, in the evening, soon after sunset. It was not, however, very uncommon for people to be attacked during the day. Of these I saw several who had fallen down on the road, and suffered from the complaint in rather an acute form. Many I found taken ill in the morning, almost immediately after eating their usual meal of cold rice. Whether this may have had any share in exciting the peculiar morbid action in the body, already perhaps predisposed to its influence, or whether it was merely the effect of accident, I have not been able to ascertain. Several intelligent natives, however, say that persons who used warm rice in the morning, instead of the cold, were less liable to the attack. How far this is founded in fact, I cannot give an opinion.

The debility was the most remarkable symptom. In one man, whom I had occasion to see, the prostration of strength was so great that he could hardly move a limb, though he had been, fifteen minutes before the seizure, in perfect health, and actively engaged in his usual occupation as a gardener. Spasm was also a predominant and severe

symptom in many. In robust persons, the spasms were generally accompanied with writhing of the body and countenance, and moaning peculiarly expressive of distress. In those of a slender make, and who, as formerly remarked, were frequently the cases that came under my care, the disease appeared in a less aggravated form, at least as far as regards the cramps. Here the cramps were usually slight, and the patient would merely complain for a short time of griping pain and drawing in the limbs. Many of the old and infirm, after a few discharges, especially when they followed in close succession, sank rapidly into a listless, cold, and motionless state, in which the powers of life seemed to be nearly suspended for several hours before death closed the scene. Fever very rarely attended the attacks of the disease, and delirium, or even confusion of thought, was scarcely ever observed until great exhaustion had taken place. The tongue was generally moist and clean.

I am led to think that the origin of cholera may be found to depend chiefly on a noxious exhalation in the atmosphere, and which had been produced by certain natural processes, maintained on the surface of the country in consequence of the unusual and unseasonable falls of rain that

had for some time before taken place so generally over Hindostan.

No. 27.*—I received accounts of the cholera having made its appearance in different parts of this district early in November last. About the 22nd of the same month, I saw some cases of it at this station and the villages in the neighbourhood. From that period to the beginning of December, it continued to increase, and carried off great numbers. After the first week in December, the disease abated, and decreased gradually till the end of the month. Still, however, a number of cases appeared daily; and about the middle of January it recurred with nearly its former violence. It continued to spread for a few days, and then rapidly subsided again. Now very few cases occur.

With respect to the contagious nature of the disease, no circumstances of much importance have occurred to me. In compliance, however, with your request, I beg to mention those which seem to belong to that part of the subject. When the disease appeared in this neighbourhood, I frequently observed that some villages were affected,

* J. Whyte, Surgeon, Combooconum, Feb. 7, 1819.

while others, though situated at no distance, and also the town of Combooconum, escaped for a time. However, after Combooconum was invaded, I constantly observed that the cholera raged with violence in some parts of the town, while others remained for a time healthy. In some instances, it was not till several days had elapsed, that the latter came to suffer in their turn. This seems to militate against the source of the disease being alone in the atmosphere; for all these places must have been equally exposed to the action of the air. A similar conclusion is supported by the circumstance, that the cholera has continued to spread under all atmospheric variations. I am inclined to consider the disease as contagious, and that it is propagated by effluvia arising from the body.

No. 28.*—There being much reason to believe that the cholera, which has made such extensive ravages in different parts of India, would make its appearance in this camp, every step was taken to resist the attack. Many families of Sepoys, &c., on their road from Jaulnah to this camp, died of the disease, and those who arrived were the first

* J. Dean, Surgeon, Camp, Candeish, August 5, 1818.

that suffered. No case was observed, even of a suspicious nature, until the 13th of July. The morning of the following day I heard accidentally of a man who had been taken ill with vomiting the preceding evening. The symptoms had increased during the night, and he complained of violent pains about his bowels. At day-light, the dresser was sent for; but the man was dead before he arrived. While learning the history of this man, I was informed that a native woman, belonging to the artillery, was then labouring under the disease. I immediately went to the hut, but she had that instant expired. This woman was recently arrived from Jaulnah. Her friends, who accompanied her, described the disease which caused her death to be of the same description as the cholera which had been so fatal at Jaulnah.

No. 29.*—The number of deaths here has been much greater than I had led myself to expect. The disease seems to occur with very different degrees of virulence in different places, and even at different times in the same place: for example, in this camp the first invasion of the disease was

* W. Wilson, Surgeon, Mhow, Sept. 7, 1818.

much milder than the second. During the latter attack, moreover, it varied considerably in violence at different times: almost every man who was taken ill on the 19th and 20th of July, perished. It also may be stated, as a reason for my being less successful than I expected to have been, that the malady had advanced considerably before many patients could obtain assistance to convey them to the hospital; and when arrived, having no person to pay particular attention to individual cases, I found it next to impossible to prevent their drinking of cold water. The rains prevailed at the time, and if the patients could not procure the water otherwise, they drank it from the pools about the tent. Neither could I be as much with the sick as was desirable: in visiting the three hospitals of which I had charge, I had to travel a circuit of five miles; the patients, therefore, were necessarily committed for long periods to the care of native assistants, and even of these, only one could be given to each hospital.

The natives of this part of the country are in the habit of administering a strong solution of common salt in water, to patients in cholera. Some give a mixture of arrack and onion juice. These remedies have a strong emetic effect, and the natives say that the practice is successful.

After leaving Mhow, I gave tartar emetic to one or two slight cases, with certainly a good result. An opportunity, however, has not occurred since of trying this plan sufficiently.

It appears impossible to say what is the cause of this disease. It has been raging in one quarter, so that a single march will take you clear of its range. Almost every village, however, has had it in turn. The cholera is clearly independent of any sensible change in the state of the atmosphere. We have seen it in the hottest and in the coldest weather, and during the rains.

No. 30.*—A detachment of Europeans from Madras, under the command of Major Wahab, arrived here with the cholera amongst them. The disease first attacked these troops at the Kistnah, after exposure to a heavy storm of wind and rain, and it continued with them from thence to this place, although all the villages in their route were entirely free from the disorder. During the march, sixty individuals perished, of whom eight were Europeans. On its arrival here, the detachment encamped about two hundred yards in front

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* A. Connell, Staff-surgeon, Secunderabad, May 20th, 1819.

of our artillery lines. In this new situation, three Europeans and a number of natives died. At this time no case of cholera had occurred in the encampment. The Europeans, however, of Major Wahab's detachment mingled with our party of artillery; and, in the course of four or five days, the disease began among the latter. Several were severely affected, but they all recovered through the prompt medical assistance afforded. The next seized was the wife of a conductor, in the artillery lines. She was attended, for a couple of hours, by her friend Mrs. Gray. Mrs. Gray was seized soon afterwards, and died the ensuing morning. The son of the latter, a boy about six years of age, was infected the day after his mother died, and recovered. My sub-assistant, Mr. Hoskins, who was constantly with the sick, contracted the disease, and died in twenty-four hours. Another acting sub-assistant, Mr. Sleven, who attended particularly to Mrs. Houghton, a patient that had suffered severely, was attacked; and Mr. McDougall, an assistant-surgeon, who was much among the sick, was also seized. From the artillery lines, the disease travelled to the bazaars, and many of the natives were carried off. The men of his Majesty's 30th regiment, who are in barracks about half a mile to the right of the

line, completely escaped, not a man having been affected, or any of the followers.

I beg to add, that Mr. Jones, surgeon of the 6th light cavalry, has just arrived from the Kistnah, by the same route as Major Wahab's detachment pursued. Mr. Jones states that he found the cholera prevailing in every village, having commenced soon after the passage of Major Wahab's detachment. The inhabitants said they had got it from that detachment.

How far any of these facts seem to indicate that under certain circumstances this malady is of a contagious nature, I shall not pretend to determine; but during our present uncertainty on that point, it might be advisable to prevent troops, who have the disease, from encamping in the immediate neighbourhood of cantonments and stations.

The most effectual treatment, with the Europeans, was immediate and copious blood-letting, and then calomel and laudanum. I have observed that cases in which there is much vomiting commonly terminate in a favourable manner. The frequent vomiting shews that the stomach has not entirely lost its vital powers. On the contrary, in those cases where there is much purging, with little or no vomiting, death generally ensues; and the most speedily fatal are the attacks in

which there is little of either vomiting or purging, shewing, as it were, that the whole alimentary canal is in some degree paralysed.

No. 31.*—Before speaking of the cause of cholera, I beg leave to advance the following facts, on which my opinion is founded :—

1st. Several showers of rain fell about the middle of June, which considerably reduced the temperature of the air. The weather since has been cool and pleasant. The thermometer seldom varying four degrees in twenty-four hours. The wind blowing steadily from the south-west. The sky has been generally cloudy, and the heat of the sun has never been great.

2nd. The cholera prevailed in Nagpore during the month of May. Upon hearing of the march of Captain Doveton, with a detachment in which the disease existed, it was generally apprehended that the men would bring it here. The detachment arrived here towards the end of June, and the cholera commenced among us the 3rd of July.

3rd. The Russel Brigade arrived here on the 4th, and left this the 5th, without a symptom of the disease. In a few days after, it broke out

* J. Kellie, Surgeon, Jaulnah, July 7th, 1818.

among them, and was attended with great mortality. Messrs. Palmers' party arrived the 4th, and marched on the 6th, without sickness; before they had reached Aurungabad, many of the party were attacked. The disease began in Aurungabad, soon after their arrival.

4th. The first case I heard of at Jaulnah, was in the death of a woman of the Sepoys, encamped in Cawderabad. The first case I saw was the son of the preceding, a boy of four years old, who had been constantly with his mother during her illness. Shortly after her death, he had been seized with similar symptoms, and in a few hours he was also carried off. From this period the disease spread rapidly, as from a focus, among the inhabitants of Cawderabad; and on the day following, it extended to the troops and to the bazaars.

5th. Cawderabad is situated towards the rear, and to the right of the lines. The disease raged most severely about the right, centre, and the bazaars, the streets of which extend to the gates of Cawderabad.

6th. The Royals were immediately in front of the general bazaars, with which they held constant communication. They suffered much from the malady.

7th. The men of the Horse Artillery were a

considerable way in front. They had less direct communication with the general bazaar, and little intercourse with the Royals. They suffered comparatively very little.

8th. A woman having been taken ill, was assiduously attended by her daughter, who became soon after infected herself. Two children, whose mother had died of the disease, were discovered in the bazaar, lying under a blanket. The elder, about three years old, had received some medicine, and was slowly recovering. The younger, a baby of ten or twelve months, who had been clinging to the breast of his dying parent a few hours before, was now in the last pang. Instances of this sort were numerous.

9th. Of the European patients in Field Hospital for other complaints, three were seized with cholera after patients had been admitted with the same disease. Of these new cases, two, one on each side of the ward, were at the part nearest to that which had been appropriated to the reception of cholera patients.

10th. Orderly Sepoys, attending on the sick, were so generally attacked, that their attendance came to be enforced with difficulty.

11th. When it appeared in a family, it usually happened that several of its members were seized.

To these facts I have been an eye-witness, and from them I infer that the cholera is occasioned by a specific morbid poison, *sui generis;* that this poison is formed by the disease itself, and that the disease, in consequence, is communicated by contagion from one person affected with it to another.

* In observing the further progress of this dreadful malady, I am still the more fixed in my opinion of its contagious nature. How, it may be asked, is the poison produced? Is it generated in a place? Or is it carried into the locality? If generated, and not contagious, the operation of the poison would be confined within certain limits to the particular spot, as it happened to be diffused through the atmosphere. It might float for a time on the gale, accompany the seasons, and be connected with the meteorological changes. But cholera has observed none of these habits. The disease has travelled in the very face of the wind, from village to village, from one military station to another, and in the exact route of troops. From Nagpore to Jaulnah, from Jaulnah to Aurungabad and Mulligaum, from Aurungabad to Seroor, and from that to Bombay. It has

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* Second Report, dated October 7th, 1818.

progressively visited the different villages between this and Hyderabad. At Hyderabad, two officers have lately fallen a sacrifice to the malady. One of these had constantly attended the death-bed of the other, and he himself was a corpse forty-eight hours after. And are not these facts indicative of contagion? Shall we still be answered by the puerile question—"If it be indeed contagious, why are not all people equally liable to the disease, or why are not the medical attendants themselves attacked?" This knot is scarcely worth untying; we may cut it at once. We are all liable to it, and will be attacked whenever exposed to the poison in a state sufficiently strong to act on our constitutions, provided they have been prepared for the reception of the virus by any of the various predisposing circumstances. Why does vaccination so often fail? And how does it come to pass that the plague has not overspread the world?

No. 32.*—The cholera broke out shortly after the junction of a large detachment from Chicacole, and just at the time when another joined from Masulipatam. I am uncertain whether to attribute this circumstance to an accidental coinci-

* Surgeon Wight, Samulcottah, March 23, 1822.

dence, or to suppose that it was brought by these troops. The first patients were Samulcottah people, and I did not hear that any cases had occurred in the detachments on the route. The disease, I believe, is generally considered to be non-contagious; but there is perhaps some reason to suspect the accuracy of this opinion, when we recollect that it appeared first in the lines of the battalion, and that for some time it had almost invariably attacked bodies of men upon the march. The troops lately arrived may not have had the cholera actually raging among them, although its fomites were present, and ready to be called into action whenever the predisposing circumstances occurred. The people of Samulcottah seem to have been placed under the influence of these circumstances, for the disease immediately began to spread amongst those with whom the strangers first associated. These facts appear to shew that contagion assists in spreading the disease. But how are we to explain, according to this view, the sudden decrease of the malady without the adoption of any measures to effect its suppression? The same thing, however, has been observed with regard to every contagious epidemic, not excepting even the Egyptian plague. The plague is as constantly found in Constanti-

nople, as the small-pox is in London; and, like the latter, it only prevails extensively in particular seasons.

No. 33.*—The cholera, which appears to have originated at Jessore, is said to have extended to the adjacent villages, and to the whole province of Bengal, including the principal cities on the east and west side of the Ganges, in a progressive manner. In the upper provinces of Hindostan, its visitations were observed to be more irregular. Here, we are told, it often happened, that a village situated on the line of route apparently taken by the malady, would remain untouched, while the people of the adjacent country were suffering severely; and, that after a time, when the disease was subsiding among the latter, and the inhabitants of the village were about to rejoice in their exemption, it would return, and depopulate the spot that had previously escaped. It is also observed, that after it had taken a considerable course along one side of the Ganges, it would ultimately visit the opposite bank. The analogy existing between cholera and the Egyptian plague is very conspicuous.

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* R. H. England, Surgeon, 1821.

Hernandez observes, " We have seen this disease cease to commit its ravages, by the mere interposition of a wall or a river." Prosper Alpin, Russel, and Sonnini, have remarked that patients afflicted with the plague, on being brought from an infected spot, and carried into a place where the predisposing circumstances do not exist, lose the power of communicating the disease to other persons. Infants are more exempt from the attacks of plague than persons grown up. As far as my observation extends, the same rule holds in cholera. I have seen several young infants, who depended on the breast for nourishment, exposed to all external influence in common with their mothers, yet, while the latter were expiring under severest cholera, the children lay beside them in perfect health. In consequence of the sudden appearance of cholera in a spreading form—its attacking, in various places, persons of different ages and temperaments—and its equally sudden departure—an inference has been drawn, that it is under atmospheric influence, and that it cannot be of a contagious nature. The grounds of this opinion are too slender and doubtful to carry conviction. Two old buildings, situated in the town of Tutacoreen, which I converted into hospitals, contained on an average about 260

sick men of the first battalion of the fifteenth regiment of native infantry. The healthy troops of the same battalion, were encamped about a quarter of a mile from the town. In a period of twelve days, five mild cases of cholera occurred amongst the sick men in hospital; and during the same space, the number of persons attacked belonging to the healthy troops, amounted to twenty-eight. A second dresser, and a servant of mine, who were much employed about the sick, took the disease, and died. I experienced two mild attacks myself, and two other medical servants attached to the battalion were seized. I find that the disease has prevailed among the attendants in various places. These occurrences, together with the progressive extension of the disease over an immense track of country, tend to establish a contagious principle. Troops, and travellers of various descriptions, have suffered from cholera during a march in places where no vestige of the disease could be traced among the inhabitants, though they too were equally exposed to fatigue and privation. We must, therefore, infer that atmospheric influences are not at all times, if ever, sufficient to propagate the disease extensively without an additional agent. Shortly after such visitations from troops

and travellers, the disease has been observed to attack, for the first time, the inhabitants of the places visited. The cholera has prevailed in both wet and dry weather; and it has been noticed that a change from either of these states to the other, has been attended with a mitigation, and sometimes a temporary cessation of the disorder. I witnessed its dreadful ravages in the fifteenth regiment of native infantry, during the stay of the troops at Tutacoreen, in February, 1819, and on their subsequent march to Quilon. The weather was not considered unseasonable. In those places which we visited, in the vicinity of the coast of Coromandel, and in the district of Tinnevelly, the weather appeared clear and rather warm. On the Malabar coast, the rainy season commenced rather early, and it was accompanied with a mitigation of the disease.

I had heard that emetics were found useful in the treatment of cholera. Being scrupulous in making the experiment, I have tried the remedy in only a few cases, that were in a hopeless state, and that had resisted the remedies commonly prescribed. In four cases of this kind, where I tried the emetics, two proved fatal, and two recovered. One of the latter had suffered severely from the disease, though he had been bled, used

opium in various ways, and had taken the other contingent remedies. By the eighth hour of the attack, he was visited by the majority of those symptoms which are considered indicative of a speedy and fatal termination. Despairing totally of his recovery, I commenced giving him at this period a third of a grain of tartar emetic, every fifth minute, with large draughts of warm milk, until it had made some sensible effect on the stomach. At the expiration of forty minutes, the effect was evinced in considerable nausea and occasional vomiting. The use of the tartar emetic was then discontinued, but the milk was not stopped. In the course of an hour, the system presented a favourable change. The cadaverous feel, and collapsed state of the countenance, gradually wore off, the animal functions slowly returned to a healthy standard, and the patient recovered. The other case, which terminated favourably, very much resembled the one just described, and the treatment was similar, with the exception of the milk, as thin meat broth was substituted. In the two fatal cases, the patients lived longer under the malady than is usual. In some cases, where a few of the precursory symptoms of cholera existed, and which would most probably have led to the complete formation

of the disease, I have given emetics, and with perfect success in checking the symptoms.

No. 34.*—On the road from Nagracoil to this place, several of the Sepoys, and some of the followers, were attacked with cholera; and since we arrived others have been taken ill, shewing that they must have brought it with them in a dormant state. Several of those that attended the sick have been also seized; and there is some reason to think that the effluvia from the dead body has produced a few cases. In the limited number of patients treated here, blood-letting was resorted to; and where the blood could be procured in a full stream and large quantity, the cases uniformly recovered. One of my servants presented a rather remarkable instance. Previous to the attack, he had been much exposed to the rain at Nagracoil, and had also attended the sick. The disease was very severe, and he was bled to the extent of twenty-four ounces, which came away in a full stream. The usual dose of calomel and laudanum was administered, and soon afterwards he was reported "fast asleep." In the course of two hours, however, the disease had

* Surgeon Provan, Travancore, Nov. 5, 1819.

returned, with increased violence. When I saw him, the pulse could barely be felt vibrating occasionally. Veins were opened in both arms, and the blood came away, sometimes in drops, sometimes at intervals, and sometimes in a stream, for a few seconds. By persevering in this way, during upwards of an hour, it came at last in a full stream, and about sixteen ounces were taken. After a severe struggle he recovered, and is now only suffering from the effects of an acid blister.

No. 35.*—The second battalion, first regiment native infantry, left Nagpore February 6th, 1821, under orders to march to Trichinopoly. The men were then in a healthy state, and continued so, with the exception of trifling complaints, until they arrived, March 11th, at Secunderabad. Here they were encamped (men and officers) in a small recess among slightly elevated hills, near the Hoosum Saugur tank. The families were in more open ground, but it was low, and near the edge of the water. They remained in camp while the sick carriage and other necessaries were refitting, to enable them to proceed on their route. During the whole of this period no case of cholera oc-

* J. Stokes, Surgeon, 1821.

curred. The disease did not make its appearance before the 19th of March, when Thomas Hitchens, quarter-master-serjeant, was suddenly seized at night, and died in the course of twelve hours after the period of attack. In reply to inquiries regarding the history of this case, it was said that Hitchens had been a good deal exposed for some days to the influence of the sun; that he had frequently stayed out late at night, and drank freely. After the attack of Hitchens, fresh cases continued to occur. By the 21st, as the troops approached the Kistnah river, new instances of the disease were observed now and then; but they were for the most part mild and tractable. During the 1st of April, the party crossed that river, and pitched their camp on a sloping ground of black soil, near the village of Khatoor. The cholera now began to spread rapidly and with malignity, creating alarm in every direction. The followers and the women were the first that suffered: it commenced among the latter almost as soon as they had crossed the river. The number of deaths that took place this day was considerable. The ensuing day, April 2nd, the ground was changed to Byeapore, and the camp pitched on high, clean, red soil. There was now a trifling diminution of the number of

seizures, but no abatement of the mortality. April 3rd, the troops crossed the Toomboodra river, and came to Kurnaul, where they remained till the 6th, encamped on high ground. The violence of the disease had somewhat abated, but there was no prospect of its subsiding. The casualties, though less than in the preceding days, were still considerable. April 6th, the battalion moved, and came to Pundypad; 7th, no abatement in the disease: the deaths were many, and among them, Mr. Assistant-Surgeon Rumbold. Mr. Rumbold awoke in the middle of the night, and complained to an officer sleeping in the tent, of an extraordinary feeling of anxiety and giddiness. He had only two or three evacuations, which were quickly succeeded by great prostration of strength, and death in a few hours. Mr. R., previously to the attack, had undergone much fatigue, both of body and mind, and was very apprehensive that he should take the disease. The cause of this dread seems to have originated in a circumstance which happened the first or second day of the active period of the malady. While visiting some bad cases, he became affected with a nausea and giddiness, and, coming out of the tent, he fell down in a fainting state. From that

period he believed or fancied that he would die of cholera. By the 25th, the cases were less numerous, and much milder in their symptoms. From this to the 9th of May, few patients presented the usual symptoms: they had merely slight purging, exhibiting the disease perhaps in the mildest type. So trifling were these affections, that they generally subsided in a spontaneous manner, or after a little medical treatment.

Some cases may now be mentioned, which would seem to favour the supposition that cholera may be communicated from the sick to persons in health. During the 1st of April, and immediately afterwards, when the violence of the disease was extreme, the circumstances were unfavourable to much inquiry or observation regarding its nature and properties; but as the malady decreased in malignity, and the attacks became less numerous, and milder in their symptoms, a facility was afforded for learning their history, and watching the occurrences developed in their progress. With many patients that came to hospital, it was found that some time previous to their having been attacked, the disease had existed in their families to a greater or less extent. In one family, a

single member had been taken ill, or had died: in others, the cholera had spread progressively through the whole, or nearly, and also among such as officiated as orderlies or attendants in the hospital. Of the latter, the first person attacked was a man who had assisted in applying frictions to Hitchens. The next was the second dresser; then Mr. Rumbold. A mother and daughter lived in the same tent: the mother was seized with the complaint, and the daughter contracted the disease soon afterwards. Of two boys, servants of Colonel Bishop, one died on the 16th, and his fellow-servant, who attended him, died on the 18th. Goopaloo, a drummer, died on the 18th, and another drummer, who had been his orderly, was attacked. Two brothers, who had been living in the tent where their mother died fifteen days before, were admitted into hospital. Sick men, from being in the same place with cholera patients, took the disease. Several facts similar to these might be adduced.

No. 36.*—I shall proceed to make a few remarks on the contagious nature of cholera. The vast difference of opinion, however, which exists upon

* E. Chapman, Surgeon, 1821.

this subject, shews that my observations should be introduced with the utmost diffidence. As proof of the non-contagious nature of the disease, I have heard it stated in argument, that "being an epidemic, it can only be communicated by means of the atmosphere." That it is an epidemic, there cannot be the slightest doubt; but it is by no means incompatible with diseases of this kind, to be also of a contagious nature. Epidemic maladies, indeed, are very generally capable of being propagated through the medium of contagion. Typhus fever, for example, often attacks the population of an extensive district, yet no one who has ever witnessed its ravages will question its frequent propagation through the influence of contagion. Small-pox commenced its inroad in the form of an epidemic, and I would ask, is it not likewise a contagious malady? The same holds with regard to measles, and scarlet fever. In short, it would appear that epidemics, for the most part, (however certain it may be that they depend for their *origin*, in the first instance, on a morbid change induced in the atmosphere,) are susceptible of communication, and consequent propagation, by contagion.

As it does not appear, therefore, to be incompatible with the nature of an epidemic to be also

contagious, and as such is very generally the case, let us proceed to examine some facts that occasionally occur with regard to the cholera.

A corps or detachment, on the route, is invaded by the disease, and a number of individuals are suddenly affected. Here the malady is committing its ravages in the character of an epidemic, in consequence, perhaps, of its prevalence at the village or place of encampment. At a short distance, however, from this, in a number of instances, no cholera is prevailing; and it might naturally be expected, that the removal of the troops from the ground on which they were attacked, to a spot where the disease did not exist, would at once prevent the occurrence of other cases. Such would undoubtedly be the result, were the disease simply epidemic, and not contagious; but as regards cholera, widely different is the fact, which, more than once, I have had an opportunity of observing.

A corps or detachment of troops suffering under cholera, in consequence of encamping within the influence of a tainted atmosphere, cannot rid themselves of the disease for a considerable number of marches, though they may have removed far without this influence, to a place where no cholera prevails. Notwithstanding the

change of locality, the disease leaves the camp leisurely, and cases will continue to be propagated solely by infection. Having myself witnessed this more than once, I venture to say, that an inquiry into the particulars of many other marches made by regiments, corps, or detachments, will tend to confirm the observation. To mention particular instances in which the cholera has been communicated from one individual to another through the medium of contagion, is necessarily attended with much difficulty. Generally, the whole of a body of men are within the influence of the atmosphere which is charged with the virus, and all, therefore, may become susceptible of its effect. It is to be observed, however, that those individuals who are either accidentally or necessarily attendant on the persons affected, are exceedingly liable to the complaint. Many medical officers have suffered; and, in my own case, I feel the utmost confidence of having experienced the attack through infection. During a march performed some months ago, at a time when cholera was not prevalent in that part of the country, an orderly havildar was suddenly attacked. Being solicitous for his recovery, I remained in the hospital several hours, watching the progress of the symptoms. At the moment of quitting the tent,

I felt a little nausea, and attributed it to the particular fetor of the interior. The following morning I was attacked with cholera, which proved nearly fatal. At this period, no other case occurred. In the same detachment, a short time previous, it happened that a woman, who was very anxious for the safety of her child, slept in the hospital tent, in which were several cholera cases. In the morning she was seized with cholera, and she died. Besides this woman, one of the three orderlies attendant on the sick, and who slept within the hospital, was seized. Thus it will be seen, that of four individuals who chanced to sleep in an hospital containing the infection of cholera, two, or one-half of all so exposed, were attacked on the following morning. On the other hand, in the whole camp, consisting probably of 1,500 or 1,600 persons, not five cases had occurred. The native commissioned officers had the privilege of remaining in their own tents when suffering from sickness; and here I noted several other examples, in which the disease appeared to have been extended, through contagion, among the families of these officers.

The contagious character of cholera seems to have been observed by the natives themselves; and therefore it commonly happens, that the sick

are avoided by those who are not called upon, as an act of duty, to attend. The village where cholera prevails, is usually evacuated for a short period, that the contagion may be destroyed. From all that I have observed, I cannot avoid looking upon the disease as contagious, although I am fully aware that the contrary opinion obtains. There are many objections, probably, which will admit of being advanced in opposition to the evidence in favour of contagion; but facts should be allowed their due weight in the discussion, and in some measure, they should be permitted to supersede trivial objections. It should be remembered, moreover, that a certain predisposition of body, on the part of individuals, is necessary for the reception of the contagion of cholera, and of all other contagious diseases; a circumstance that explains how many individuals may be exposed, and only a few of the number happen to be infected.

Amongst the variety of medicines exhibited, there is not one, I believe, which has not, at different times, both failed and succeeded, in the curative intention. It hence becomes a proper subject of inquiry, to ascertain how far the disease may be under the controul of any remedy; or, uninterrupted and left to its own course,

whether it may in any case be susceptible of a spontaneous cure? I am convinced that a number of cases, in the absence of all medical aid, do terminate otherwise than fatally, and occasionally under circumstances which, apparently, are of the most unpromising aspect. I had occasion to remark this among some camp-followers, who were attacked. They obstinately refused to submit to the treatment prescribed, and, even without the use of spirituous liquors, they ultimately recovered. At the time, also, they were unavoidably exposed during the night, to a cold and humid atmosphere. One of these patients I noticed particularly; his situation was near my own tent, and I am assured that he neither had recourse to native medicines, nor would he accept of any matter prescribed. His circulation had become nearly extinct, his feet were cold, and a sheet was all that he could procure in the way of covering. While he remained in this unhappy condition, he fell into a sound and natural sleep, during which his pulse, and general circulation, were restored; and when he awakened, his health was completely established, with the exception of excessive debility. From these, and other facts, I am of opinion, that the resources of nature, in this, as in most diseases, are often

competent to the preservation of life. It is difficult to say in what manner the beneficial effect is brought about, but it would appear that the restorative power of sleep* is the medium. So far as I recollect, every instance of cholera in which sleep was induced, even for a few hours, subsequently recovered.

I do not mean to infer, because nature is occasionally competent to compass a cure, that the use of remedial agents is not absolutely necessary. The fact, however, will shew that caution is required in determining the precise effects, whether deleterious or salutary, of the medicines employed. In the early stage of the disease, and while the pulse is little diminished in strength, nothing certainly should forego the use of blood-letting. The extent to which bleeding should be carried, must necessarily be regulated by the effect it produces on the system generally, and the circulation in particular. The operation should be performed without delay, as in a short time the sinking of the pulse will shew that the period for the use of the only efficient remedy has passed. I have

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* Here Mr. Chapman falls into an error similar to those which he afterwards so ably exposes. Sleep is evidently an *effect*, and not the cause, of the cessation of the disease.—J. K.

ventured to denominate blood-letting the only efficient remedy; and, if this observation be not supported, certain it is, that no other remedy can be said to be efficient. In the treatment of cholera, I shall ever consider the other remedies adopted, as auxiliaries at most; for it is the height of folly to suppose, that the mere extrication of a little bile from the liver, or perspiration from the skin, are the indications of cure in this rapid and fatal disease. While the malady continues, the patient passes nothing bearing the appearance of bile; it has therefore been inferred that an evacuation of bile, if procured, would be the means or cause of the patient's recovery; whereas, the evacuation is merely an effect. It is not that a patient recovers, because he has passed a little bile; but that bile has passed, because he has recovered.

No. 37.*—The 53rd regiment, 900 strong, marched from Bangalore, the 11th of May, in a very high state of health and efficiency. The sick list contained only forty. Every other man was at his duty, and not one was left behind. They improved upon the march, and the sick

* W. Pollock, M.D., Fort St. George, July 1st, 1820.

list decreased to thirty-five. On the 20th of the month, however, a violent case of cholera appeared in a man in the hospital, a convalescent from dysentery. He died early the ensuing morning. This was the commencement of a severe visitation, and the following is the course of its progress:—

May 20th,	near	Palamanair	1 Case.
21st,	—	Ditto	1
22nd,		Vencottaghirry Pettah .	1
23rd,		Chittoor	1
24th,		Ditto	2
25th,		Newsingry Pettah . .	3
26th,		Mullpaddy	6
27th,		Arcot	8
28th,		Cowry Pauk Fort . .	12
29th,		Damul	12
30th,		Carapettah	10
31st,		Tirumungulum . . .	6
June 1st,		Amrambaidoo . . .	2
2nd,		Cowoor	1
23rd,	at	Fort St. George . . .	1
24th,	—	Ditto	1
		Total . . .	68

During the first week of this visitation, the epidemic was evidently not recognised by the unfortunate subjects of its attack, for they failed to report themselves until they were beyond the

reach of all treatment. The form in which the disease made its first appearance will perhaps account for this. In many of the cases, even of those which terminated fatally, there were neither evacuations nor cramps. In some of them, even to the last moment of their existence, there was not a complaint made of any kind, except an appalling consciousness of immediately approaching dissolution. In all of these cases, however, the most characteristic symptom of the malady was present; the circulation was arrested in every instance, and, in addition, the patient had exactly the appearance of a body that had been drowned, and just taken out of the water.

The weather, from the 22nd of May, the day that the 53rd descended into the Carnatic, was intensely hot, the thermometer ranging between 100 and 108 degrees, in the tents. During the afternoon of that day, there was a violent thunderstorm, which overthrew all the tents, and for an hour or two drenched every one in rain. Had the storm occurred before the epidemic, it would doubtless have been considered a powerful exciting cause of the disease; but the cholera commenced on the 20th, while we were yet on the table-land of Mysore, and in a climate comparatively temperate. From what I have seen of the epidemic,

I am disposed to consider it as the operation of a peculiar morbid poison. Various causes, which have been assigned for its production, are nothing more than predisposing circumstances, that produce the susceptibility necessary to its display, as is well known to be the case in a host of other diseases. No atmospheric vicissitude will account for the appearance of the epidemic at this time, or why it did not appear among the troops of the 53rd regiment, in the year 1816, when they performed the same march, in the same month of the year, halted on the same encamping grounds, and were exposed, as far as I am capable of judging, to identically the same external circumstances, including, to its utmost extent, the whole range of atmospheric vicissitude.

SECTION III.

Medical Treatment of the Contagious Cholera, founded on Experience and Reason.—Progress of the Disease, exterior to Hindostan.—Laws of the Disease.—Evidence of the Existence of these Laws.—Quarantine.

If the reader have attentively perused the abstracts of the Indian Reports, he cannot fail to have observed a few facts of paramount interest, which, by the concurrent testimony of a variety of witnesses, far apart, and ignorant, at the time, of each other's views, seem to have attained the rank of general facts. These general facts, in characterising the contagious cholera, shew that it is exceedingly fatal and rapid in its course—that it may exist in various degrees of severity in different individuals, and in various degrees of severity in different localities, and at different times in the same locality—and that in the treatment pursued, blood-letting, calomel and laudanum, brandy,

arrack, and other spirits, and the application of moist or dry heat to the surface of the body, were the grand remedial agents.

A mere knowledge, however, of the principal symptoms of a disease, and a catalogue of the medicines which, in a multitude of instances, have effected its cure, will not be sufficient to qualify a physician to practise with either well-earned credit to himself, or advantage to his patient. The period in which a medicine should be administered, or its use discontinued or modified, is of the *first* importance. It is here, indeed, that the physician is thrown, to a greater or less extent, on the resources of his own judgment and experience; and unfortunate is the lot of that patient, whose medical adviser happens to be deficient in either of these essential requisites.

The importance of ascertaining the period in which a patient should be submitted to the action of a remedy, and the period when the further continuance of that remedy would become useless or injurious, is well illustrated by what has occurred in the history of the continued fever which is common among the poorer classes of the people in England. With regard to the medical management of this fever, two opinions formerly obtained among many members of the profession.

One party, advocating the universal utility of stimulants, prescribed wine, &c. in almost every case; while the other party, pursuing a system in theory and practice exactly the reverse, maintained that blood-letting was a step almost indispensable in order to open the door to recovery. It is worthy of remark, that the results of these antagonist systems, as far as they can be estimated in a record of cures and deaths appertaining to each, were nearly alike. This fact, though apparently singular and inexplicable, is perfectly natural. Both systems were equally erroneous, taken as a whole; but in their course of operation, much good as well as evil was undoubtedly produced. Patients who had laboured long under the disease, and in whom the vital power was nearly exhausted, would receive benefit from the stimulating plan; and those who had been recently attacked, and in whom the vital power was little impaired, and the action of the blood-vessels rather high, would receive benefit from depletion. When either plan of treatment, however, was resorted to indiscriminately, it would often be productive of the most injurious consequences.

Yet the errors of former years should not lead to the supposition, that their advocates were behind ourselves in mental penetration, and the desire to

discover the simple truth. These errors were less the faults of the individuals, than of the times in which these individuals formed their opinions; and it would be unphilosophical, and very unfair, to weigh their merits or defects unless in connexion with the comparatively obscure light of their day and generation.

In the present day, the experience of all rational practitioners demonstrates that the medical treatment of fever must be adapted to the peculiarity of the existing symptoms in every case. At one period of the attack, the prevailing symptoms may require blood-letting, while at another period, and in the same individual, wine and other stimulants may be absolutely necessary. Each stage of the complaint will have its appropriate remedy. Considerable as the professional skill must be to determine the proper quality and quantity of this remedy, there is equal, if not greater skill, required to determine when the use of all medicine should be intermitted; to say when the patient should be left for a time, under careful observation, to the curative efforts of nature alone.

As a continued fever usually takes from ten to twenty days to run through its course, a long period is afforded to distinguish the different

stages of the disease, and to select and apply the remedial measures best suited to each particular stage; but in some other maladies, the duration of the attack is extraordinarily short, and consequently it is more difficult to recognize and discriminate the different stages. The contagious cholera, for example, if uncontrouled by the aid of medicine, generally reduces its victim in a few hours nearly to a state of vital exhaustion: the rapid changes, therefore, which the symptoms undergo, often leave the astonished practitioner prescribing at random.

It appears to us that the progress hitherto made in distinguishing the individual stages of cholera, and their appropriate treatment, has been productive of little practical advantage. Many practitioners, certainly, have shewn in the management of their patients, a degree of discrimination worthy of the highest encomium, and several of these may be recognised in the abstracts of the Indian Reports; but their success did not lead to the formation of rules for the guidance of others. There seems to have been no system generally followed or laid down, for the adaptation of the remedies to the existing symptoms, and the state of the patient's strength. This unfortunate defect was noticed in India; it was thought, however,

that the crowds of people affected about the same period, and to whom immediate advice was necessary, precluded the possibility of making at all times the proper distinctions. Surgeon Wight, in his Report* to the Medical Board of Madras, observes, "On the general principles of the treatment of cholera, I have little to say. Most of the remedies which I have employed, have been tried and recommended before. From the experience acquired in the present epidemic, I can neither add to, nor detract from, former recommendations. They were uncommonly successful in some apparently hopeless cases, and, on the contrary, failed completely in other cases where the circumstances appeared very favourable. The causes of these differences are often difficult to ascertain, even when the circumstances of the patients have admitted of their being minutely investigated during life, and their bodies examined after death; but much more so when neither of these can be done.

"In favourable circumstances for medical inquiry, a minute examination into the patient's previous history and ailings often points out the cause of these differences; but in a regimental hospital,

* Dated Samulcottah, March 20, 1822.

and particularly a native one, during the ravages of a rapidly fatal epidemic disease, such inquiries can seldom be made. In the hurry and confusion necessarily attendant on these occasions, the leading symptoms are usually all that are inquired about to form a diagnosis. The general likeness of the disease being established, the medicines that have been found useful are prescribed, without attending to the minute circumstances of the case, on which an accurate diagnosis (distinction) can be formed. Should it so happen that the constitutions, &c. are alike, or nearly so, it is probable that they will all recover; but should it so happen that one or several cases occur, in which the circumstances are very different from the above, it is more than probable that they will all fall victims under the same treatment that saved the others. This kind of practice is, I believe, called treating a *name*, and not the disease before us."

Mr. Wight's observations exhibit the candour and penetration which are the fruits of an intelligent and honourable mind; but we cannot agree with him as to the difficulty of making the proper distinctions, or the summary manner of getting rid of it, by treating every patient alike. In our opinion, the difficulty is rather to be attributed to the hurry and confusion which beset the

practitioner in the treatment of this rapid disease, than to any want of distinctive marks in the stages of the malady itself. Hereafter we shall have an opportunity of shewing the foundation on which this opinion stands. Were the distinctions, however, impracticable, we would think it more safe for the physician to rest satisfied with the application of gentle remedies that could do no harm, than to resort to those powerful means, the chance-action of which would probably produce a greater proportion of mischief than of benefit. It is scarcely necessary to add, that a physician should never permit a professional scene (though of the most distressing nature) to disturb or cloud his medical judgment.

By pursuing *names* instead of principles, many additional mistakes have been committed. Some of these are very apparent in the heterogeneous opinions which have been recorded, of the medical virtue of the different forms of moist heat, when applied in the treatment of cholera. Several physicians limit their encomiums to the warm bath; others extol the vapour bath, to the exclusion of the former; while, latterly, a third authority* maintains that a hemp-seed poultice is

* Warsaw Committee of Health.

better than either. A grain of reflection might have convinced the three parties that they were divided on the merits of a name alone. The medical virtue is the same in all, and it consists simply in the application of heat and moisture to the surface of the body. The question to be determined is the effect which these remedies are, individually, capable of producing, in a given time, upon the patient; and when there is a choice at command, we should select the strongest one of the number. Now, the warm bath is by far the most effective and convenient agent of the class to which it belongs; it communicates heat more rapidly to the body than either the vapour bath or the poultice, and the relaxing power of its moisture is commensurate. It is probable that a five-minutes' exposure in the warm bath will be more than equivalent to fifteen minutes in the vapour bath. The superior rapidity and power of the warm bath, therefore, should obtain it a preference in the treatment of the stages of cholera where the use of moist heat is indicated; but we must also remember, that in consequence of its superior power, a greater degree of caution is necessary, in order to guard against its being too long continued, or misapplied.

The misapplication of the remedial measures

has been the source of extraordinary confusion and contradictory testimony. Several remedies, on which the strongest dependence is to be placed in the management of cholera, have fallen repeatedly into temporary disgrace, from their having been prescribed in stages of the disease when their use was altogether improper. In this way, besides the warm bath, we often find that laudanum in large doses, after having had its virtues attested by a host of witnesses, is characterised by some persons as totally inert or deleterious. The same has been said of calomel, and indeed of all the efficient resources of the medical art which have been extensively tried.

The character of venesection has been libelled in a peculiar manner. At an early period, during the progress of this singular malady, the blood deserts the superficial vessels of the body, for the deep-seated and internal parts; and even before the period has arrived in which a loss of blood could prove injurious to the patient, not a drop of that fluid can in general be procured, after the opening of both veins and arteries. In ninety-nine instances out of a hundred, where patients are said to have died "despite of blood-letting," it will appear, upon examination, either that no blood flowed from the incised veins, or that it

came away in drops, or in a small broken stream, rarely exceeding a few ounces in quantity. On the contrary, where blood was freely obtained to the extent of twenty or thirty ounces, and where the depletion was followed by proper auxiliaries, the patients have usually recovered.

That the success of blood-letting did not depend upon the disease having assumed a mild form, a circumstance which raised some trifling medicines to surreptitious notoriety, is apparent in the advantage derived from its use in the centre division of the grand army, where the cholera was more extensively destructive than at any previous or after-period in Hindostan, admitting of a fair comparison. In the centre division, (says the Bengal Report,) the disease was seen on the largest scale, and each remedy was brought to the full test of experience by numerous and repeated trials. The disorder first fell upon the camp in an insidious manner, and no suspicion was entertained of the dreadfully epidemic form which it was soon to assume. The cases coming under observation were comparatively mild, and were treated successfully with calomel, opium and brandy, in moderate doses, at regular periods. But as the symptoms increased in intensity, this plan frequently failed, and it became necessary to

greatly augment the quantities of those medicines. At length the largest doses of stimulants proved useless, and the miserable sufferers were cut off in spite of every means, after an hour or two of illness. The bodies of some of the dhooly-bearers and native servants were then opened, and such appearances discovered as seemed to warrant a new mode of treatment. The lancet was accordingly had recourse to; at this period, however, the patients were almost all natives, seen at an advanced period of the disease, and in whom universal coldness and collapse had usually taken place. It was rarely found, therefore, that the blood would flow, and the practice was soon abandoned in despair. Then brandy and other cordials were freely given, to raise the pulse and remove debility, and large doses of laudanum to relieve spasms; but still almost all died.

While the practice was in this unsettled state, and the medical officers were in extreme suspense as to the proper means of resisting the disease, the European portion of the army began to be attacked. About five o'clock, A. M. of the 14th of November, two Europeans belonging to the flank battalion were admitted into the hospital. They had the disease in a violent shape, and the spasms especially were dreadful. A scruple dose

of calomel, and one hundred drops of laudanum, in a glass of brandy and water, were given to each, and repeated at intervals during the day. No relief, however, succeeded to the treatment. The patients continued in horrible torture, and died before eight o'clock at night. During the course of the same evening, four men of the same corps were admitted together. It was resolved, that bleeding should be tried in all. From two of them no blood could be obtained, but from the others it came freely, and as instant relief followed, thirty ounces of blood were taken from both. Next morning, the patients who had lost blood were out of danger, while of the two from whom no blood could be obtained, one had died, and the other expired before noon.

Emboldened by the successful result of this trial, the medical officers of the flank battalion endeavoured afterwards to bleed every patient, and, with one solitary exception, no person died from whom twenty-four ounces of blood were obtained. If the patients were seen within two or three hours from the beginning of the attack, the practice usually succeeded; but at a later stage, when the pulse was gone, the skin cold, and the nails blue, a flow of blood could not be induced by any means. Sometimes, even in the com-

mencement of the attack, the extreme violence of the symptoms rendered the attempt ineffectual.

Thus far we have endeavoured to vindicate the character of blood-letting, and to shew the manner in which the other efficient remedies have occasionally and undeservedly lost the confidence of the profession. We shall now proceed to the consideration of a discriminative system of medical management; and in the first place, it will be proper to begin with a short description of the disease itself.

The course which the attack of acute cholera in general pursues may be divided, for the purpose of medical treatment, into two types or varieties—one, the *protracted* or severe type; the other, the *rapid* or violent type.

DISCRIMINATIVE TREATMENT OF ACUTE CHOLERA.

Protracted Type.—The protracted type consists of two stages; and in order that the practitioner may easily recognize these stages respectively when he meets them, we shall enumerate few of their symptoms beyond those of practical value.

First Stage.—The patient complains of a feeling of anxiety, or of uneasiness at the pit of the stomach. After some time nausea supervenes, and the uneasiness changes into a feeling of heat or pain. To these symptoms succeed vomiting and purging, and prostration of strength. The evacuations, at first, consist of the common contents of the alimentary canal; afterwards, of a fluid like rice-water. Occasional cramps are felt in the limbs. The pulse is small, and rather quick. The skin feels a little cold, and the temperature is gradually decreasing. The countenance of the patient is somewhat shrunk, and the features appear sharper than natural.

If the disease be left to itself, or if it continue to advance in spite of the remedies that may have

been used, the symptoms increase in severity, and the patient comes to suffer from

Violent cramps in the upper and lower limbs, and at times in the muscles of the chest and belly. The cramps, in general, are not constant; they recur at short intervals in paroxysms. The vomiting and purging are severe. The coldness of the skin has increased much; it feels moist, and is of a bluish colour about the face, hands, and feet. The palms and soles of the latter appear corrugated, as if they had been steeped in water. The pulse is barely, or not at all, to be detected in the wrists and temples. The countenance is ghastly, and expressive of great anxiety. There is distressing thirst, and burning heat or pain in the region of the stomach or bowels.

If the disease be still uncontrouled, it will pass into the second stage.

Second Stage.—Under the increasing debility, the vomiting, purging, and cramps are subsiding, or have disappeared. The patient lies in a state of helpless exhaustion, and is almost incapable of making the slightest movement. He is apparently insensible; but as his senses remain unimpaired to the last, he may be roused to say "Yes," or "No." The pulse

is gone, and even the action of the heart is extremely feeble. The surface of the body is deadly cold. The breathing is oppressed, or scarcely perceptible, and the countenance is quite cadaverous.

This short description contains all that appears necessary to form a general picture of the acute symptoms in protracted cholera. The treatment, also, may be greatly simplified by the omission, at the present time, of the name of every remedy of secondary power—a course which shall be adopted.

In the treatment of the first stage, the primary object of the physician will be to allay the cramps, the vomiting, and the purging. To carry this indication into effect, he should not rest content with the application of any single remedy; it will be accomplished most effectually and rapidly by a combination of measures. The warm bath, blood-letting, and a large dose of calomel and laudanum, are to be immediately prescribed. If the bath be ready prepared, the patient should be placed in it, and during immersion he may take the dose of medicine, and have the blood-letting performed. One remedy, however, should never wait upon another; the first at hand should be administered first. Their influence upon the symptoms is to be vigilantly watched. As soon as the cramps are sub-

dued, or have received a decided check, the patient, with all possible expedition, should be removed from the bath, and placed between *dry* heated blankets. Dry warmth should be further afforded by surrounding his body and limbs with bags of heated sand.* If the cramps, &c. do not return, the previous remedies are not to be repeated. New measures are now required to remove debility, and to excite the natural action of the bowels.

The treatment of the *second* stage will be very different from that of the preceding. During the active progress of the first stage, the vital power is considerable, and there is high spasmodic action in various parts of the body, which enable the patient to bear with advantage the loss of blood and the sedative effects of large doses of laudanum; but in the second stage, the patient is in a state of *real* exhaustion, and would consequently sink under the use of these strong measures. Even the warm bath is dangerous to life at this period, and its use must therefore be avoided.

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* Here *dry heat*, be it remembered, is the remedy, and not the sand which contains it. On this principle, bottles of hot water, rolled in flannel, have been employed, and also hot ashes, bran, oatmeal, &c. A more efficient mode of applying dry heat than any of these may suggest itself; but occasionally, to prevent loss of time, we must take the first that offers.

In the second stage there are two principal indications for simultaneous adoption—1st, To remove the deadly coldness of the body; 2nd, To remove the great debility. The coldness must be attacked by the application of *dry* heat. The bags of hot sand should be assiduously applied to every part of the body, and, in addition, heated blankets above and below the patient. For the removal of the excessive debility, some of the most powerful stimulants must be had recourse to, as ether, brandy, or other spirits, hartshorn, &c. These remedies are to be continued until the patient finally sinks under the disease, or until reaction is fairly come round, after which they may be gradually dispensed with.

When called to see a patient who apparently is labouring under most of the symptoms of the second stage, we should always inquire into the history of the case before we prescribe; for without this information, fatal mistakes may be often committed. If the disease have been established a few hours, or if the existing symptoms have been preceded by the usual phenomena of severe cramps, vomiting, and purging of some duration, we are entitled to conclude that the patient is really in the second stage, and that he should be treated accordingly. But if the symptoms have commenced in this severe form, and that only a

short time previous to our arrival, we must be guided in our remedial proceedings by the rules suited to the treatment of the *rapid type* of cholera—a variety of the disease to be presently described.

Rapid Type.—In many instances the attack of cholera commences with very aggravated symptoms: the patient falls suddenly down in a state of extreme weakness, and perhaps temporary insensibility, and the energies of the constitution are so much oppressed by the influence of the morbific poison, that there may be little or no visible attempt at reaction. The pulse almost instantly, or in an exceedingly short period, disappears at the wrist, and the heat of the body rapidly declines. In these cases, cramps, vomiting, and purging, are either completely absent, or an attempt to establish these symptoms is only evinced in slight spasms, and the occurrence of one or two nearly passive evacuations. The violence of the disease, however, in this type, and the uniform course which the symptoms are inclined to pursue until death closes the scene, should not deter us from the application of a discriminative method of medical treatment. The acute symptoms of the rapid type may be divided into two stages—one, of *apparent* debility; the other, of *real* debility.

The chief remedial measure is blood-letting; and here its use is founded upon the fact, that, for a certain space of time after the commencement of the attack, the resources of the constitution are not to be measured by the external symptoms. Apparently the patient is in a state of hopeless debility; (and this will generally prove to be the case, if he be left to the efforts of nature alone;) but, when properly assisted by art, the constitution is often enabled to rally, and eventually to recover from the shock. The time, however, in which this medical service may be performed with the greatest hope of success, is unfortunately extremely limited, in some cases not exceeding many minutes after the patient has been seized.

If the practitioner arrive before the blood has deserted the superficial vessels, blood-letting should be performed to the extent of twenty or thirty ounces, in an adult. Then other auxiliary measures will be required. Of these, nothing should supersede the immediate and continued application of dry heat to the surface of the body. The value of this remedy is incalculable, and it has the advantage of being applicable at any period, whereas the opportunity for the abstraction of blood may be soon irrecoverably lost. Internal

stimulants, as ether, hartshorn, &c. should be also administered, in order to expedite the establishment of reaction. If the second stage, that of real debility, have commenced before the patient is seen, the treatment will consist of dry heat and internal stimulants, without blood-letting.

In many cases of the rapid type, a complete inversion of the train of symptoms common to the protracted variety of cholera, has been observed during the progress of reaction. As a patient recovers from the state of stupefaction, or apparent exhaustion, into which he was hastily precipitated, and as he gradually gathers strength, it may happen that cramps, vomiting, and purging, will then be developed for the first time. This proves, as it were, by analytic evidence, that cramps indicate a comparatively mild form of the disease. If the cramps become severe under this new arrangement of the morbid phenomena, we must resort to the curative means hitherto recommended for the spasmodic stage and its consequences.

The discriminative principles now laid before the public, are those which we found the most successful in the treatment of the cases of cholera that came under our personal direction in Calcutta. Our suspicion of the accuracy of the

practice then generally pursued, was first excited by the contradictory statements made as to the value of the various remedies, and by the equable mortality which had resulted after numerous trials, though of the most opposite character. The justness of this suspicion was no longer a matter of doubt when we became practically acquainted with the disease. Patients suffering from cholera having come under our controul, we followed in their treatment the opinions of persons of experience in the country, and who seemed to be competent authorities. The result, however, was by no means encouraging. The medicines that appeared to be serviceable in some cases appeared to be detrimental in others, and in a few they undoubtedly hastened the catastrophe. With these facts before our eyes, one of two conclusions was forced upon our judgment—either that these medicines were altogether injurious, and that some patients had recovered notwithstanding their bad effects; or, that they had been prescribed in the unfortunate cases during a stage of the complaint when their use was decidedly improper.

To determine on which side of the question probability rested, we applied to the Secretary of the Medical Board in Calcutta for information regarding the details of the practice that had been

followed in the Indian army. This request was immediately granted; and, in addition to much verbal information on the subject, we obtained the perusal of several documents. The testimony afforded in favour of blood-letting, calomel, laudanum, and the application of moist and dry heat, in the treatment of cholera, was overwhelming, and no doubt remained upon our mind that these were the remedies chiefly worthy of confidence. But with respect to the time in which these remedies should be administered, or their use discontinued, the practice seemed to have been often capricious, and certainly far removed from scientific precision.

It often happens that the errors and excellencies of our predecessors in the field of research afford an equal measure of instruction. In this case we endeavoured to turn both to advantage.

In the abstracts of the Indian Reports, instances may be observed where the use of the warm bath in the second stages of acute cholera seemed to hasten the death of the patients. Instances of a similar character might be multiplied by referring to facts extraneous to this volume, but a few will be sufficient for our present purpose. That moist heat should have a dangerous influence on patients in a state of *real* debility, appears very natural,

when it is recollected that even persons in health will faint* after long immersion in a bath at a high temperature. In the treatment of cholera, the temperature of the bath was generally above 100 degrees, and frequently was raised to 110 degrees, in the hope that this strong heat might counteract the rapid loss of the natural warmth of the body. In our opinion, the warm bath, or any other form of moist heat, should never be used in acute cholera, unless at the commencement, or during the prevalence, of severe spasmodic symptoms.

Numerous as the patients certainly were who had their chance of recovery diminished by the injudicious application or continuance of the warm bath, a still greater number must have suffered from the improper use of laudanum. This powerful narcotic was frequently prescribed in large quantities, in every stage of the disease. The people, moreover, independent of medical advice, resorted to the free administration of brandy and laudanum, as a sort of panacea, or universal specific. When prescribed early in the spasmodic stages of cholera, it is probable that drachm-doses

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* If a patient in acute cholera be placed, during the stage of real debility, in a warm bath, he will probably faint, and never recover from the fainting fit thus induced.

of laudanum were generally beneficial; but their bad effects in the stages of debility may be estimated by what might be expected to follow their administration in the last stage of a lingering typhus. Large doses of laudanum, or of calomel, appear serviceable only in the symptoms of the first stage of the protracted type.

When a powerful remedial agent attains a high reputation in the treatment of a violent malady, a proportional degree of caution is necessary to guard against its abuse. The influence, then, of blood-letting under certain contingencies, demands a minute and discriminative consideration. That, in the stages of cholera where a loss of blood would prove injurious, no blood will flow from the incised veins or arteries, is true as a general rule; but occasionally an exception to this rule may be encountered; and we should be prepared, if possible, to meet the exception. It appears to us, that

Blood-letting, were it practicable, should be avoided,

1st, Towards the termination of the first stage of the protracted type;

2nd, During the whole of the second stage;

3rd, In the rapid type, during the period of real debility.

Indirectly, attempts at blood-letting have been more injurious than directly. As the report commonly obtained, that every patient from whom blood could be freely procured was almost sure of recovery, the other remedies were partially thrown into the shade. The general fact being known, without the qualifying circumstances, much time was often spent in fruitless attempts at blood-letting, which ought to have been devoted to the steady application of the auxiliaries.

The foregoing strictures have been confined to the remedies that came under our personal observation. The partial success that attended their administration at first, when we paid little attention comparatively to the stage and type of the disease, was strongly contrasted with the effects which followed their discriminative use. In the former instance, the mortality amounted to the proportion of one in four; in the latter, the proportion was diminished as low as one in nine. Both sets of cases occurred in the same inroad; and after having made every reasonable allowance for fluctuations in the intensity of the disease, this discrepancy could only be accounted for satisfactorily by admitting that an improvement had taken place in the method of cure.

There is no disease more true to its general

characters than acute cholera. The description of the symptoms as they appeared in India, will apply to their course in every part of Asia, and in the islands; yet it is very difficult to institute a legitimate comparison between any two inroads, in order to discover the relative value of their medical treatment. For, although the disease be true to itself, the duration of its individual attacks, under different inroads, and in different persons during the same inroad, is extremely variable. Two patients, seized about the same moment, may be in opposite states of the malady—one in the first stage, the other in the second—at the end of a short period, when they come to be seen by the physician. The event in this way will be strongly influenced by the constitutions of the patients, and their degree of predisposition to the attack. A knowledge of these circumstances may preserve us from drawing hasty conclusions.

The rules given for the management of the protracted type of cholera were those which we latterly followed in the cases of this variety. The principles were rigidly adhered to, although with different patients different means were unavoidably adopted to compass our intentions. In several instances, it was impossible to procure a warm bath at the time this remedy was prescribed; or in

some, perhaps, during the whole of the spasmodic stage, when its use would have been proper: instead, therefore, of the bath, or while it was preparing, moist heat was applied, by dipping pieces of blankets into hot water, and folding them around the limbs and body of the patient. As soon as the spasmodic symptoms were subdued, or their violence completely abated, and not before, we had recourse to dry heat, and such internal stimulants as ether, hot brandy and water, &c.

Blood-letting, the opportunity for performing which is so precarious, is not indispensable to the recovery of a number of patients who are subjected to cholera in either type; but patients who have been freely bled, in general recover more rapidly than those who have not. The blood-letting appears to cut short the attack in a decided manner, and afterwards, with the establishment of reaction, the secretions which had been suppressed, the heat of the skin, the pulse, and the appearance of the patient, gradually return to their healthy standard. In cases where recovery is slow, and more particularly in such as have not been bled, reaction is occasionally the forerunner of febrile symptoms and derangements of the bowels, which impede the progress of the cure, and require to be treated on the general principles of medicine.

One source of failure in the treatment of cholera remains to be noticed. When a person is seized, something more than the advice and assistance of a competent physician is necessary, even at an early period of the attack, to afford a moderate hope of success. The best advice will be bestowed in vain, unless it be carried fully into effect by the people who are in attendance upon the sick for that purpose. Any neglect in the administration of the internal remedies, or in the application of heat, may prove fatal to the patient. As an example of this, and also of the benefit derived from the common remedies without blood-letting, we shall give a case that happened among the sailors in the harbour of Calcutta.

The subject of it was a young Frenchman, serving on board an English vessel. Having been suddenly seized, about the hour of breakfast, with great exhaustion, and the other symptoms of cholera in the rapid type, a messenger was despatched for medical aid. When we arrived, fifteen or twenty minutes afterwards, the stage for blood-letting had passed. The patient seemed to be in a state of stupefaction; his eyes had a dull, vague appearance, and he lay apparently unable to move a muscle, and as if unconscious of any thing around him, or of his situation. By a shake,

however, and a smart interrogatory, he could be roused to make a reply; but he uttered no complaint, only wishing to be left to die undisturbed. Dry heat was assiduously applied to his body and limbs; and friction of the skin was attempted, by communicating a sliding motion to the heated blankets. Internally, stimulants were administered at stated intervals, consisting of ether, hot brandy and water, and aromatics. In the course of a few hours, a slight improvement was visible in the symptoms. He could be roused with less difficulty, and his breathing was less feeble than before; the symptoms continued slowly, yet steadily, to abate, and in the evening he was so far recruited from the shock, that we began to entertain strong hopes of his eventual recovery. A purgative was now prescribed, and arrangements were made that through the night a man should unremittingly attend to the application of the dry heat, and, during the waking hours of the patient, to the occasional administration of a little hot brandy and water.

Next morning, at the visit, we found our patient on deck, stretched along a temporary bench, and screened from the sun by a sail supported in the form of a tent. His comrades said they had brought him up for the benefit of fresh air, as

the place below was close and suffocating. The extreme coldness of the skin, which had been partially removed by the artificial warmth and the use of the internal stimulants, had again returned, and the debility had also increased; but his mind was not so inactive as on the previous day. Being asked respecting his feelings, he readily complained of distressing thirst, and a sensation of sinking. The change for the worse excited our suspicion that the remedial measures had not been carried fully into effect through the night; and this suspicion was confirmed by the information which, upon inquiry, we obtained from the person who acted as mate to the vessel. The mate said that during the day he took heed that every care should be bestowed; but at night, when the management of the case was solely left to the men in the forecastle, he feared that little attention had been paid to his orders. "The men," he said, "had a strong prejudice against the patient *because* he was a Frenchman, and it was a vain thing to oppose reason to the prejudices of seamen." As there was no help for the past, we adopted measures for the future. The heat and the medicines were to be administered throughout the day, and, as the purgative had not operated, a few grains of calomel were prescribed.

It was also projected, in the event of the patient rallying, that some trust-worthy individual should be procured to attend upon him at night.

When we saw the patient again in our evening visit, he was lying in his "berth," and the disease had become so aggravated that the case was evidently hopeless. His mind, however, was perfectly correct, and he ascribed the change in the symptoms to the influence of a wetting which he had received while on deck, about the middle of the day. It appeared that the heartless wretches, calling themselves "British sailors," had been slow to remove the poor fellow during the commencement of a heavy shower. His sheltering sail and blankets, therefore, were in a few seconds penetrated by the tropical rain, and a state of collapse had succeeded, from which he never recovered.

Before closing our remarks on the treatment of cholera, we would again observe, to impress it the more deeply on the memory of the reader, that we have as yet abstained from the consideration of every remedy that has not been submitted to the test of our own experience. Some medicines, indeed, of which we have had experience, as oil of peppermint, and other aromatic stimulants, are also passed over, because they are

capable of doing neither much good nor harm in any case, and therefore their use may be safely left to the discretion of any practitioner. We are not, however, inclined to say that our catalogue of efficient remedies contains all that we might think ourselves justified in prescribing in a wider field of practice. In the hope of shortening the several stages, and guided by discriminative principles, many strong medicines might be added to the list, and in this way their virtues might be brought to a fair trial: but in making such trials, it should never be forgotten that acute cholera consists of different stages, and that the medicines which assist in performing a cure in one stage of the malady, may as certainly assist in destroying the patient if administered in another. During the periods suited to each, the practitioner, under proper precautions, might try the powers of almost any substance of the sedative or stimulating class, as bismuth, cajeput oil, phosphorus, &c. The promiscuous exhibition, however, of these powerful agents would probably destroy one half of the patients submitted to their action.

Mr. Preston, Assistant-Surgeon on the Madras establishment, has given an account* of the influ-

* Communicated to the Medical and Physical Society of Calcutta.

ence of phosphorus in the stages of real debility. After noticing the poisonous character of this body, and the caution to be observed in its administration, he proceeds to state, that the cholera having appeared in a large detachment of Europeans, proceeding to Nagpore, he was requested by the medical officer in charge, to accompany him in visiting a patient who had been labouring several hours under the disease. When they arrived, the man seemed to be sinking. Considering the case altogether hopeless, the phosphorus was had recourse to, and two grains, in the form of a pill, were exhibited. After a short period, the patient felt a strong sensation of heat in his stomach; and as no unfavourable symptom arose from the first dose, a second, containing the same quantity, was repeated at the end of two or three hours. The sensation of heat increased, the forehead became covered with a warm perspiration, and the man eventually recovered. A second case was treated in a similar way, and with equal success. In a third, the phosphorus failed; but it is said that the man was dying at the time the remedy was administered. He had just arrived at the ground, after having been exposed for some hours in a sick cart to both wet and cold.

Mr. Preston entertains a very favourable opinion

of phosphorus in the stages of real debility. It is an exceedingly strong stimulant, and its dose must be cautiously regulated.

Emetics, composed of tartrite of antimony, or of sulphate of zinc, or of salt and water, are said to have been useful in some cases of cholera. We have never seen emetics tried, but we can conceive, at the very commencement of the disease, and previous to the occurrence of aggravated symptoms, that the shock produced by artificial vomiting, might at times succeed in breaking the chain of morbid action, in the same way as an early emetic will occasionally obviate an attack of common fever. When the symptoms, however, have become fully developed, the exhibition of emetics is perhaps attended with little benefit.

Some practitioners approve of the application of blisters to the region of the stomach. The cantharides blister being too slow to be available, nitric or sulphuric acid has been substituted, to produce a hasty destruction of the skin. The advocates of this practice say, that it relieves the vomiting, and the irritability of the stomach; as these symptoms, however, soon yield to the bath, laudanum, &c., and as the patient ought not to suffer unnecessary pain, we cannot for this purpose recommend such severe measures.

Spirituous embrocations, also, have been applied, but they are evidently injurious. These fluids rapidly evaporate, and consequently they will increase the coldness of the body, an effect above all others to be avoided.

The curative property assigned to magnesia is not countenanced in this epistolary extract;*— "I have heard from some of my friends of the 4th regiment of Native Infantry, that they suffered much from the cholera. On the 1st and 2nd of June, they halted at Luggenpett, where the disease first began, though there was no sign of it in the village. On the 6th they were at Tackmutta, and the camp was a scene of lamentation. The milk and magnesia had a fair trial, and not a man was cured by it. Brandy, calomel, and laudanum, were afterwards resorted to, and they appear, by the account I have before me, to have succeeded in seven cases out of ten." Although magnesia be totally incompetent to the cure, or even the retardation of cholera, there is evidence to shew that a drink, containing a small quantity, has proved very grateful to the feelings of some patients. Potash probably would answer the same end. We were informed by

* Asiatic Journal, Vol. XIII. 1822.

Captain Dick, chief secretary to government at Mauritius, that during the prevalence of cholera in the island, a slave* accidentally drank some water containing wood-ashes, and the beneficial effect which followed, led to their frequent exhibition. These testimonials in favour of alkaline fluids, are rivalled by the encomiums which Mr. Annesley has bestowed on acidulated drinks. He alleges that water containing a little nitric acid, forms the very best beverage.

Castor oil, either in the simple form or in combination with laudanum, has been substituted for calomel, in the treatment of many cases, and a favourable opinion has been recorded of its efficacy. Medical men in Europe are greatly prejudiced against large doses of calomel, and, on this account chiefly, it might be well to give the castor oil a further trial; but we must register it as our conviction, that this is the only experimental change which may be hazarded, in the use of what we have called the efficient remedies. In the present state of our knowledge, new medicines should be prescribed secondarily, and considered merely as assistant to the influence

* On the estate of Monsieur J. B. Riviere, Commandant of Plains Wilhems district.

of blood-letting, laudanum, calomel, the common stimulants, and moist or dry heat, as the stage and type of the malady may require.

From all that has been said, it will be apparent that *no single* remedial agent has yet been discovered, capable of effecting the cure of cholera, when once the symptoms are fairly established. Neither do we entertain sanguine hopes that a *specific* will be discovered hereafter. In this statement, however, there is nothing that should lead to professional opprobrium, or to public despair. Most maladies with which we are acquainted are only to be subdued by a variety of remedies—prescribed either simultaneously or in succession—at short, or at distant intervals. Those which we have recommended for cholera will prove eminently successful, whenever the patient is submitted to their action early in *the first stage;* and under other circumstances, it would be unjust to ascribe the issue of the case to any weakness in the remedial agents. If a person seized with extensive inflammation of the lungs, delayed applying for advice until the disease had advanced into the last stage, his death would not implicate the skill of the physician. The same conclusion may be extended to typhus fever, and indeed to every violent malady. But, as the majority of

these affections usually take several days to attain their acmé of virulence, the danger incurred by a temporary delay is in a manner trifling, compared to what it would be in a case of the contagious cholera. The cholera, even in the protracted type, frequently runs through its stages in the lapse of a few hours, and therefore, to ensure a successful result in its treatment, the resources of physic must be applied, and modified with still greater rapidity. In those cases where death takes place instantaneously, or in a few minutes after the accession, the catastrophe should be no more ascribed to the inefficiency of the medical art, than the casualties that occur from lightning or drowning.

There have been, then, three causes in operation to account for the dreadful mortality which has in general attended the progress of cholera. Two of these—namely, instant death, and death in consequence of delay in obtaining medical advice—were beyond the controul of the physician; the third cause is within his controul, and it originates in the inert or promiscuous treatment of the disease. To oppose and destroy the third cause, has been our earnest object.

MAP

of some of the Principal Places in

ASIA & EUROPE,

visited by the

Contagious Cholera,

from August 1817, to September 1831.

Note. For the Localities in Hindostan see First Map.

ICELAND
NORWAY
SWEDEN
FINLAND
RUSSIA
White Sea
Archangel June 1831
Dwina R.
Petersburg Jan. 30 1831
Valenda Aug. 1830
Jaroslaw Sept. 12 1830
Kostroma Sept. 8
Vologorod Aug. 1830
Vladimir Oct. 1830
Moscow Sep. 1830
Kasan Oct. 1830
Sinbirsk Oct. 1830
Orsk
Samara Oct. 1830
Orenburg Sep. 1829
Tambow Sept. 1830
Penza Aug. 1830
Saratan Aug. 1830
Tarizin Aug. 1830
Astracan
Caucasus
Kutais
Tiflis
Erivan
Erzeroum 1823
Taurus 1800 & 1820
Teheran 1821 & 1830
Yezd Sep. 1821
Ispahan Oct. 1821
Shiraz Sep. 1821
Bushire Aug. 1821
Cambaroon
Bussorah 1821
Bagdad 1821
Mosul 1822
Aleppo
Bengazi 1828
Muscat June 1821
Bombay Aug. 1818 & May 1821
Jessore Aug. 1817
Jeraeem 1813
Rangoon
Ceylon 1818 & 1819
Penang Oct. 23 1819
Achcem 1819
Malacca
Sumatra
Batavia
Samarang 1821
Macassar 1823
JAVA
BORNEO
Pontianak 1821
Celebes
Moluccas or Spice Islands 1823
Timor 1823
Manilla Oct. 5 1820
Philippine Islands
Kuleu-chou-fou Dec. 1820
Pekin 1821 & 23
Hoang Ho
Nankin 1823
Kiang
TIBET
CHINA
MONGOLIA
Desert of Shamo
Desert of Cobi
TONKIN
Macao
Canton 1820
COCHIN CHINA
CAMBODIA
BURMAH
Bay of Bengal
HINDOSTAN
Mauritius Port Louis Nov. 1819
Bourbon St. Denis Jan. 1820
NEW HOLLAND
Equator
AFRICA
ARABIA
Red Sea
Mediterranean Sea
Black Sea
Caspian Sea
Persia
Turkey
Poland
Warsaw April 1831
Lemberg
Brody May 1831
Pultava Oct. 1830
Odessa
Prussia
Berlin
Vistula R.
Danube R.
Dniester R.
Don R.
Euphrates R.
Tigris R.
Ural R.
Volga R.
Jaik
Caucasus
Vienna
Austria
Hungary
Italy
France
Spain
Portugal
Germany
Netherlands
Belgium
Denmark
Hamburg Oct. 1831
Scotland
Sunderland Oct. 24 1831
England
Ireland
Baltic Sea
North Sea
Mediterranean Sea

0 20 40 60 80 100 120 140 Long E. from Greenwich

J.E Kennedy del.

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PROGRESS OF THE CHOLERA EXTERIOR TO HINDOSTAN.

Hitherto the geographical progress of cholera has been considered only in connexion with Hindostan; it will therefore be proper to give in this place a very brief sketch of the route which the pestilence described exterior to that country, in Asia, Europe, and the Islands.

Soon after the cholera had originated in Jessore, it spread along the neighbouring rivers, and committed much havoc among the shipping of the Hooghly. In 1818, a severe inroad was experienced in some of the Company's vessels anchored at Saugor Island. The first fatal case occurred the 7th of September, on board the Warren Hastings; and this was the forerunner of several others. On the morning of the 10th, a

seaman was attacked, and he died in a few hours. During the afternoon of the day, a party went ashore to bury the corpse. Having performed that melancholy duty, they returned to the boat, and, to their astonishment, found the man who had been left in charge, convulsed in its bottom. He died at four o'clock next morning. Then the boatswain was seized. He lingered to the 15th, when he sunk under debility. In the course of a few days, eight additional persons were attacked. The disease, however, was less severe in these patients, and they all recovered, after the use of blood-letting, anodynes, and calomel. Fewer cases happened on board of the other vessels at the anchorage, and the General Hewitt completely escaped, in consequence, it is said, of the great care that was taken to preserve the men from the predisposing circumstances.

From the Bay of Bengal, the cholera extended eastward along the coast of the Asiatic continent, and through the islands of the Indian Ocean, to the farther boundaries of China, and to Timor, near New Holland. In the year 1818, the malady had appeared in Arracan; in 1819, in Penang, Bankok, the Island of Java, &c. Canton was invaded during October, 1820, and in the succeeding year the contagion entered Pekin. By

November, 1823, it had traversed the Molucca or Spice Islands, including the Island of Timor, where it appears to have attained the south-eastern limits of its progress. But still pursuing its north-eastern course, the pestilence continued for several years to ravage the interior of China; by 1827, it had passed to the north of the Great Wall, and desolated several places in Mongolia.

As contagious diseases, that can exist in different climates, have a disposition to extend in every direction, along the highways of human intercourse, we find that the cholera, even by sea, was not restricted to an eastern route. Soon after its appearance in the southern parts of Hindostan, the pestilence stretched from the coast of Coromandel to Ceylon, and during December, 1818, and the earlier months of 1819, it prevailed in that island, with a degree of virulence previously unsurpassed. Here, also, the shipping in the harbours were infected, and one of the most remarkable instances of this kind was experienced on board the Topaze, one of his Majesty's frigates. While the cholera prevailed in the island, the Topaze sailed for Mauritius, which lies about twenty-six degrees to the south of Ceylon. On the passage, seventeen cases occurred. The circumstance, however, which imparts a peculiar

interest to the attack in the Topaze, is connected with the appearance of the disease in Mauritius. The frigate arrived in the harbour of Port-Louis the 29th of October, 1819, and it was not until the 18th of November that the cholera began to spread among the inhabitants. The people, therefore, were naturally led to suspect that the malignant form of the disease had been imported by the Topaze.

Upon inquiry, it appeared that the day after arrival, the vessel had sent thirty patients ashore to hospital, who were suffering from dysentery, inflammation of the liver, or debility. No patient with decided symptoms of cholera, was observed among the men in hospital; but on board, a man had been attacked * during the forenoon of the same day with severe spasms and vomiting. On the other hand, it was urged, that one or two cases of cholera had been noticed in Port Louis, early in the month of September, and that the present very general attack should be attributed rather to the peculiarities of the climate than to importation. The latter opinion is not well supported. The one or two cases, indeed, were in all probability

* History of The Epidemic Spasmodic Cholera, by Bisset Hawkins, M.D.

climatic; the disposition to spread, however, which is the grand characteristic of the Indian malady, was not developed previous to the 18th of November, a date perfectly reconcileable to the idea of importation.

The pestilence, in the course of one month, carried off several thousands of the population of Mauritius. The subjoined extract, taken from the governor's proclamation, will leave an impression of the dread and confusion existing at the time :—

" Major-General Ralph Darling, commanding in the Island of Mauritius, &c. &c.—Whereas the Council de Commune of Port Louis, the administrators of the Bank, and the principal merchants, have represented that the dispersion of the inhabitants, in consequence of the alarm occasioned by the diseases which prevail at this moment, has rendered it expedient that the payment of all bonds, notes of hand, and other negotiable securities, coming due during the course of the ensuing six months, should be postponed for one month after the period at which the same has been made payable; the Major-General commanding has therefore decreed and decrees—From the 1st day of the present month of December, to the 1st day of June, 1820, no prosecution shall take place, nor sentence nor judgment be pronounced,

for the payment of any bonds, notes of hand, and other negotiable securities," &c.

In the early part of January the cholera had greatly declined throughout the island, and the governor was enabled, on the 6th of the month, to make the following notification :—

" The Major-General will not omit this opportunity of expressing the gratitude he feels that the awful visitation with which the island has been so severely afflicted since the middle of November last, has at length almost entirely ceased its ravages. Since its commencement in Port Louis, it has pervaded all the districts of the island."

Taking advantage of the terrible example afforded in Mauritius, the Governor of Bourbon, a neighbouring island, distant about two degrees, adopted sanatory precautions to exclude the contagion. On the 7th of January, however, a vessel, called the Pic Var,* from Port Louis, arrived off Bourbon, and had intercourse with the shore. The cholera broke out seven days afterwards, in the town of St. Denis. Nothing dismayed by this unfortunate circumstance, the Governor ordered cordons of troops to be posted to cut off all communication with St. Denis, the focus of the malady, and a lazaretto was established for the

* Madras Government Gazette.

reception of such persons as might be attacked. Cordons were also established for their preservation at St. Susanne, St. Andre, and St. Benoit; but in the consternation which seized the inhabitants of these parishes, they dispersed, to seek safety in the interior of the country. The alarm created by the pestilence in Bourbon, and the vigorous proceedings of the Governor, Baron de Mylius, may be conceived from the concluding sentence of the Order of the Day, which was, "*Surveillance, ou la mort.*" The consequences of these measures corresponded to the decision with which they were carried into effect. The cholera did not extend in Bourbon, as it had done in Mauritius, and the whole number of the persons attacked scarcely amounted to a few hundreds.

With this general notice we shall leave the southern and eastern branches of the contagion, and return to Hindostan, in order to describe a third, or westerly branch, in which the inhabitants of Europe have recently taken a deep and lamentable interest.

From the date of its origin in Jessore, the cholera occupied twelve months in crossing the peninsula of India to Bombay. In August, 1818, it entered this island, and pursued its customary desolating habits to a greater or less extent, until

the end of the year. After the first inroad had subsided, the inhabitants of the infected countries congratulated themselves on the final departure of the malady; but in this expectation they were in general deceived. The cholera continued to recur every year, in various parts of India, and also, at a later period, in China, and the Eastern Islands. Bombay was not among the places that escaped this prolonged calamity. In 1819, a second attack was experienced; and in 1820, a third, even more severe than the former. The severity, however, of the third visitation, did not secure Bombay from the influence of a fourth. In the latter end of May, 1821, the disease again commenced its ravages in a very virulent type, which is touchingly pourtrayed in the Rev. Mr. Davis's letter.* The following is an extract:—

"My spirits have been greatly depressed for some days past by the awful ravages of cholera. This dreadful disease has been for some weeks raging in all directions, but it did not appear in Bombay till about a fortnight ago. On the 28th of last month (May), it entered the barracks, in which the Bombay European regiment is quartered, and in three days I followed to the grave

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* Missionary Register.

thirty-two persons. Five more were buried yesterday, and the work of death is still going on. One circumstance is very striking—that, with the exception of two cases, the men were, to all appearance, in perfect health, the moment before they were attacked. Some of them were taken ill while on parade, and some while lying on their beds. Several of them having taken hearty breakfasts at eight o'clock, have been screaming in agony, and brought to death's door, by ten or eleven."

Before the expiration of the month in which the above letter was dated, the pestilence commenced its career in Muscat, a sea-port town of Arabia. The invasion of Muscat is for many reasons worthy of special remark, and perhaps more particularly so in its being the first stage, as it were, in the advance of the contagion towards Europe.

It has been supposed that the cholera was imported from Bombay to Muscat, and the connecting circumstances are strongly in favour of the supposition. Between these two places a frequent intercourse is maintained by ships trading in the merchandize of the respective countries. The period when the disease began in Muscat perfectly agrees, in point of time, with the conclu-

sion that it had been imported. There was also a striking coincidence in the type of the malady at both towns, which should not be overlooked in the enumeration of circumstantial evidence. The type in Bombay was extremely rapid, as appears in Mr. Davis's letter, and that of Arabia was equally so, as is shewn in the following extract of a letter,* written on board the Kent, a vessel that was lying in the harbour of Muscat:—

"The cholera was raging with violence at Muscat, and making rapid progress to the westward. Its effects at Muscat appeared to be more fatally expeditious than in any part of India. Scarce ten minutes elapsed, in innumerable cases, before life terminated. On board the Conde de Rio Pardo, a Jew merchant was in the act of closing a bargain for some tubs of sugar-candy; the merchant to whom he was talking was suddenly seized, vomited twice, and expired. So many fell victims to this scourge, that they did not even take the trouble to bury them, but sewed the bodies up in a mat, and turned them adrift in the cove. The Imaum says he has lost 10,000 of his subjects."

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* Bombay Gazette.

Still travelling westward, the cholera ascended the Persian Gulf, and visited the sea-port towns on either side. It then extended inland in two directions, following the lines of commercial intercourse. On one hand, the malady was propagated from Busheer into Persia; on the other, it passed through Bassora, and pursued the course of the rivers Tigris and Euphrates, into Asiatic Turkey.

Shiraz was the first place of note that suffered in Persia. Busheer, the sea-port leading to this city, is distant only ten or fifteen miles, and a constant communication for trading purposes is maintained between them. The cholera reached Busheer in August, 1821, and about the middle of September it broke out in Shiraz. The first case is said to have occurred in the palace of Shiraz, on the 15th of the month, in the person of a slave belonging to the family of the prince. During the 16th, one of the prince's wives, and some Georgian ladies, fell victims. At the end of the succeeding twenty-four hours, the prince's mother, one of his children, and several persons of less note, were numbered with the dead. The disease now spread rapidly, and within the first nine days, 1,800 casualties were reported. At the end of eighteen days, (according to an Indian

paper,*) out of a population not exceeding 40,000 souls, though a great number fled, on the first alarm, to places in the neighbourhood, and even to the open plains, full 6,000 deaths were counted. By migration and death, the town was "reduced to a desert; the bazaars were shut, and no business, public or private, transacted."

The main road extending from Busheer to the interior of Persia passes through Ispahan, and it might therefore be expected that this city would be attacked before Yezd, which lies at a considerable distance beyond it. Such, however, was not the case. The caravan departing while the cholera prevailed, followed, as was customary, the route leading through Ispahan; but, on approaching its vicinity, the gates were closed against the travellers, lest the disease should also gain admission. As a precautionary measure, the caravan was directed to pursue a route external to the walls in its further progress to Yezd. In Yezd, the cholera commenced during September, while the attack of Ispahan is dated in the succeeding month.

By the end of 1822, almost every place of note in Persia had been traversed by the pestilence, and

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* John Bull, extract of a Letter dated Shiraz, Oct. 7th, 1821.

its diffusion here, as well as in India, seems to have been favoured by the operations of war. In the beginning of August, 1822, the Persian troops under the command of Prince Abbas Mirza, amounting to 30,000 or 40,000 men, obtained a victory over an equal body of Turks, which was encamped within a few days' march of Erzeroum. A short period previous to the engagement, the cholera had appeared amongst the Persians, and some persons had fallen victims. Notwithstanding the extension of the malady, the prince persisted in pursuing the retreating enemy, and, favoured by the fatigues of marching, the pestilential inroad suddenly assumed so decisive a character, that in a few days it destroyed 2,000 of his army. The increasing mortality left such an impression on the survivors, that a precipitate retreat was commenced towards Byzied, from which place the whole army dispersed without orders.

Before the autumn of 1823, the contagion had spread throughout Asiatic Turkey, from Bassora and Bagdad to Erzeroum and Antioch. It failed, however, to reach Egypt, having died away, in this direction, near Trepoli, a town in Syria.

But, still spreading in Persia, the few districts that had hitherto escaped were now visited. In August, 1823, the province of Shirvan was in-

vaded. After traversing Baku, and other ports on the western border of the Caspian Sea, the cholera appears to have been conveyed by water to Astracan, a Russian city situated at the mouth of the Volga river. In Astracan, the disease became developed in September, and it continued to manifest itself until the rigour of winter, when this branch of the contagion, like the Syrio-Egyptian, finally disappeared.

Although Europe was relieved from the impending danger by the exhaustion of the contagious currents that had penetrated to Astracan and to the vicinity of Egypt, yet the source of these currents remained undiminished. In Persia the pestilence re-appeared every year for several years in succession, prevailing to a greater or less extent in localities that had been previously infected.

Of these repeated attacks, the one which commenced in 1830 demands the greatest share of attention. It overcame the natural and artificial barriers opposed to its progress, and eventually succeeded in penetrating to the heart of Europe. This European stream of the contagion (as it may be called) began on the western side of the Caspian, and, extending northward, it ravaged the town of Tauris in the month of June. After-

wards, crossing the Russian frontier into Georgia, it entered Tiflis, and carried off several thousands of the inhabitants. In the mean time, Baku was again invaded; and by the 20th of July, the cholera appeared once more in the city of Astracan. A vessel in which cases had occurred during the voyage, was recently arrived from Baku. In Astracan, the mortality was considerable. At the expiration of ten days, 1,229 individuals had been seized, of whom nearly one half died, including amongst them the civil governor and almost all the officers of police.

In Russia,* the cholera observed the same laws that had marked its progress in India and other countries. Adhering for some time to the route of navigable rivers and high roads, it attacked, in the first instance, the boatmen, the travellers, and the towns situated on either side of these lines of general communication. In this way it ascended the Volga, and where that river approaches the Don, a branch of the contagion took an over-land course, and arriving at the Don, diverged in a northerly and southerly direction along its banks. On the Volga, the towns were invaded in the following order of time: for example—Astracan in

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* Russian Reports.

July, 1830; Tzaritzin, Saratow, and Novogorod in August; Kostroma, Jaroslaw, and Moscow in September; Samara, Sinbirsk, Kasan, and Vladimir in October.

As the contagion had now become firmly fixed in numerous localities of the Russian empire, it continued to extend from these localities in various directions. Two remarkable branches proceeded in a northerly and southerly course. From Vologda, on the Dwina river, one of these spread towards Archangel; the other accompanied the Russian troops in the invasion of Poland.

During the summer of 1831, the progress of the pestilence has been exceedingly extensive. In April it commenced its ravages in Warsaw, and since that period it has travelled westward to Dantzic, and the gates of Berlin and Vienna; northward to Archangel, and southward beyond the Danube. In short, few towns have hitherto escaped in that immense tract of country which lies between the river Volga, the Baltic Sea, and a line passing through Berlin and Vienna; and between the White Sea, and the Balkan Mountains in European Turkey.

LAWS OF CHOLERA.

The laws which we shall notice are five in number, and they may be comprehended under the following designations :—

1st, *Climatic Influence.*—The contagion of cholera may spread in every climate, with its spreading powers but slightly, or not at all impaired.

2nd, *Predisposition.*—Persons in certain states of bodily health are peculiarly liable to be attacked.

3rd, *Latent Infection.*—The period of time during which the contagion lies dormant in the system rarely exceeds three days.

4th, *Increase and Decline.*—When the cholera appears in a town, it extends rapidly, and, in general, runs through its course in the space of a few weeks.

5th, *Contagion.*—Cholera is contagious, and its contagion is of a highly diffusible nature.

Climatic Influence.—There is nothing can shew more strongly how much mankind are dependent upon experience for their knowledge, than the opinions which, during the early progress of cholera, ascribed the extension and cessation of its inroads to the agency of the most ordinary circumstances. While the disease was spreading in particular directions through the upper provinces of India, its exciting cause was generally attributed to sudden changes of the weather, to the prevalence of easterly winds, or to the sensible character of the soil of the infected districts. In this way we often hear, that during the invasion, the wind was blowing either "deadly hot" or "deadly cold;" that a storm and the disease appeared simultaneously, and were considered as "cause and effect;" that a river or lake was dried up, and "cholera emerged from the slime," &c. &c. A longer acquaintance, however, with the phenomena has taught us to look on these coincidences as merely casual. Beyond the province of Bengal and its immediate neighbourhood, the laws of cholera have been singularly uniform, and it may be inferred that the exciting cause of the disease was equally so.

At first, also, cholera was slow to ascend mountains, and, instead of referring this to its proper

cause—the thinness of the population in such localities, and their limited intercourse with the plains—the non-contagionists declared it decisive of the truth of their opinions, and maintained that cholera could not exist in the pure air and dry soil of elevated regions. Here, as before, they reckoned prematurely. In the month of June, 1818, the pestilence crossed the mountains of Nepaul, and visited Catmandoo. And, again, in August, it ascended the lower range of the Himalayah mountains, entering, on the 10th of the month, the town of Almora, which is situated 5,337 feet above the level of the sea. In October, the disease had extended north to Deyrah Doon. In this valley, the village suffered very severely. Moreover, of a body of 900 troops, 113 were attacked, and 74—almost two-thirds of the number—perished. The medical officer was amongst the first seized, and to the want of his assistance the great mortality has been chiefly ascribed.

Cholera has since extended through various countries, contained between the latitudes of twenty degrees south, and sixty-five degrees north of the equator; and in longitude, its ravages have been propagated through upwards of one hundred degrees. We shall therefore conclude, that cholera may exist in every habitable part of the globe.

In the south of India, the contagion appears to have spread uninfluenced by the seasons; but in higher latitudes its spreading powers seem to have been less active in the winter than in the summer and autumn divisions of the year. It is difficult to decide whether this depends upon diminished energy in the contagion itself, or upon a diminished susceptibility on the part of the inhabitants to its impressions. It may depend partly upon both.

Predisposition.*—In medicine, there is not any fact better established, than that certain states of bodily health are peculiarly favourable to the formation of certain diseases. These predisposing states, as they are called, differ in regard to different maladies. Children are strongly predisposed to small-pox, measles, and chincough, while they are comparatively little susceptible of plague, typhus fever, and cholera. The nature of the constitutional condition which predisposes to the infantile affections is altogether unknown, and why one attack should render the system secure against a second, is equally inexplicable.

* The law of predisposition, contrary to the opinions of some persons unacquainted with the science of medicine, obtains, whether the disease be considered contagious or not.

Although children are predisposed to one attack of small-pox, it does not appear that they are at all times in this state of predisposition. It occasionally happens that children may have resided, or have had frequent intercourse, with others suffering from small-pox, and yet escape infection, while at a later period they will contract the disease when apparently but slightly exposed. In some rare instances, indeed, individuals seem to be proof to the contagion during life, shewing that they were never predisposed; and in still rarer instances, individuals have experienced a second attack, shewing that their predisposition to small-pox was stronger than that recognized in the general rule.

Unlike small-pox in the wide range of its infecting power, the plague, the typhus, and the cholera, attack only a part of the population. By observing, therefore, the habits and bodily condition of the people who remain untouched, and of those who are infected, we may form some conception of what constitutes the predisposition to these distempers. In Egypt, the plague chiefly prevails among the poorest classes, who live irregularly, and exposed to the deleterious atmosphere of close, dirty hovels. On the other hand, persons in comfortable circumstances, who live regularly,

and in clean, well-ventilated houses, are less susceptible of the morbid impressions. The typhus fever in England, and the contagious cholera in India, follow an analagous course.

We do not intend that the terms regular and irregular living should be restricted to the use of, or abstinence from, spirituous liquors, but to be extended to every act that can possibly throw the vital resources of the body into extremes. In this way, fatigue, whether incurred in the pursuits of business or pleasure, insufficient exercise, eating to excess or long fasting, and violent mental emotions, may prove respectively strong predisposing circumstances.

In India, the cholera attacked the various classes of the inhabitants to a greater or less extent, according as they were more or less exposed to fatigue and irregular modes of life. The Europeans suffered less, comparatively, than the natives; and of these, the higher less than the lower classes. Women, also, suffered less than men, and children in a less degree than either. The difference of predisposition in native men, women, and children, is illustrated in the following list, which exemplifies, in addition, the middle period of the increase and decline of the attack, on a pretty large scale.

Died of cholera in Bombay, during eleven days:

	Males.	Females.	Children.	Total.
1820.—May 1st	11 —	6 —	0 —	17
2nd	16 —	16 —	2 —	34
3rd	18 —	14 —	2 —	34
4th	16 —	8 —	6 —	30
5th	36 —	17 —	3 —	56
6th	46 —	30 —	5 —	81
7th	33 —	13 —	6 —	52
8th	14 —	26 —	11 —	51
9th	35 —	14 —	5 —	54
10th	17 —	19 —	12 —	48
11th	12 —	9 —	3 —	24
	254	172	55	481

The partial immunity enjoyed by Europeans over the natives has been universally ascribed to a difference of physical constitution. Weak constitutions were said to be more susceptible than those which were strong. But taking the word constitution to mean here the original resources of the system before they are impaired by disease, the conclusion does not appear to be exactly correct. If constitutional weakness were the cause of the difference, women would have been attacked rather than men. The reverse being the fact, it can only be accounted for satisfactorily by attributing the greater susceptibility of the latter to temporary circumstances, as their laborious occupations, frequent exposure to a burning sun, &c.

Had a similar degree of temporary exhaustion been induced in all—native men and women, and Europeans—it is probable that their predispositions respectively would have been the same. Were the small proportion, however, which the Europeans bore to the native population taken into account, it would, perhaps, appear that the exemption of the former has been overrated. The experience of the life-insurance offices in Calcutta does not evince a small mortality among Europeans. Of those insured at the Laudable and Union Societies,* the number of deaths between October, 1817, and November, 1818, was sufficient to reduce the value of lives to one half of the estimate formed on the best tables, and on the experience of former years. The register of the Union Society exhibited a proportion of deaths for that period four times as great as the average of the four preceding years.

In the north of India, the Mohammedans used a more nutritious diet, and went better clothed than the Hindoos, and, in general, they were less liable to the malady. That this did not depend upon the stronger constitutions of the former, is seen in the effect which succeeded to a temporary

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* Bengal Report.

exhaustion. When the cholera prevailed at Delhi, it happened to be the period of the year in which the Mohammedans observe their annual Fast, or Ramazan. During the Fast, all orthodox Mussulmans abstain from food while the sun is above the horizon. Persons of this sect, therefore, suffered more extensively during the Fast than the Hindoos, who lived after their ordinary manner. At Calcutta, many of the workmen suffered not in the ratio of their constitutional strength, but according to their temporary exhaustion. The mechanics working in the open dock-yards receive high wages, and live in a superior manner with regard to diet and other domestic comforts; yet they were more frequently seized than the day labourers of the poorest order, employed under shelter in the Cotton Screws.

Of all the circumstances predisposing to an attack of cholera, fatigue consequent to travelling, or to hard work in the open air, was the most powerful. Accordingly, we find that troops upon the line of march, and people whose occupations exposed them to the weather—as boatmen, fishermen, husbandmen, gardeners, grass-cutters, washermen, palankeen-bearers—were extremely subject to the disease. The non-contagionists advanced this fact in support of their opinion, that the exciting

cause of cholera resided in the atmosphere; but it merely indicates that the greatest degree of fatigue in the Indian climate, and consequently the strongest predisposition, was incurred in the open air. The exceptions to the rule shew that something was required apart from atmospheric influence, to engender the disease. * "While cholera prevailed at Madras, the labourers at certain public works, who were protected from the weather, who were well clothed and fed, and who had no unusual work to perform, suffered from it severely; while a body of many hundred people, employed in digging and cleaning out the beds of stagnant, brackish, and extremely putrid waters, equally during the extreme heats of the season as during cold and rainy weather, entirely escaped. This immunity is the more remarkable, inasmuch as many of them laboured during the night for the purpose of preventing the accumulation of water, and were of course exposed, with very scanty clothing, to the utmost vicissitudes of heat and cold, and to all the exhalations and depositions of the very tainted air in which they worked."

Debility from other diseases predisposes to cholera, and for this reason convalescents were often

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* Report of the Madras Medical Board.

attacked. Many were infected while under the influence of mercury, which had been administered for the cure of fever, and inflammation of the liver. The Europeans of the flank battalion, a year previous to their attack in the grand army, were debilitated by fever at Allahabad. The battalion consisted of 800 men, and of these, at one time, 200 were in hospital with cholera. The surgeon and 54 men perished.

Any derangement of the system which resembles the symptoms of cholera itself, is peculiarly liable to admit the disease. Affections of the bowels leading to vomiting or purging, are of this character; also the action of purgative medicines attended with an aqueous discharge. During the prevalence of cholera, the use of Epsom salts should be specially avoided.

It was observed by the medical officers in Bengal, that a second attack of cholera, provided the effects of the first had been completely removed, was exceedingly rare. Relapses, however, were occasionally recorded. In the Nagpore force, a few instances of relapse happened among those who had recovered from the severe symptoms. The most remarkable of these cases of repeated infection, was that of an European. He had been twice attacked while under the influence of mer-

cury, and had so far recovered from both as to return to his duty. At the end, however, of five or six days, he contracted the disease a third time, and died.

As one attack generally destroys, at least for a considerable time, all predisposition to cholera, there is reason to believe, also, that the predisposition may be impaired by frequent intercourse with the sick. People who have mingled often with the sick are in less danger of infection than those who are not accustomed to such exposure. A village (says the Bengal Report) which was visited by the cholera during the first year of its prevalence, would be much less likely to suffer, on the disease re-appearing in that part of the country, than another village which had not been previously invaded; and an individual going from the former into the infected air of the latter, would have a better chance of immunity than its inhabitants who had not yet undergone the seasoning.

The protection, however, derived from intercourse with the sick, may be lost after a time, in case the individual removes out of the infected to a healthy atmosphere. In this way also, medical men who have been steady residents in a fever-hospital, and who seemed proof to the contagion

of typhus, have been known to contract the disease immediately on their return from a visit to the country.

In a few words, the predisposition to cholera may be said to consist of *any* derangement of the vital functions of the body. While the current of vitality is urged forward at a healthy and uniform pace, the contagion has scarcely power sufficient to arrest its progress; but the least irregularity of motion, whether induced by exciting or depressing causes, will favour the operation of the contagion, and may lead to the formation of the disease. In prescribing rules of diet, &c., in order to escape this irregularity, previous habits should always be taken into consideration. The man who has for years been accustomed to luxurious living, and a moderate allowance of wine, will certainly be less predisposed to cholera in continuing these indulgences, than if he hastily adopted a sparing regimen; and a man who has lived abstemiously will have his chance of exemption increased, by persevering in his abstemious system. Every *extreme*, however, habitual or occasional, ought to be guarded against.

Latent Infection.—After a morbid poison finds its way into the human body, a longer or

shorter period will elapse before its effects become apparent in the constitution of the person infected. Individuals who have been bitten by mad dogs are generally seized with symptoms of rabies within two or three weeks subsequent to the accident; but instances occasionally occur, where the period of latent infection is limited to a few days, or extended to several months.

The contagion of small-pox usually remains dormant one or two weeks. The contagion of cholera is more rapid in its course. His Majesty's 54th regiment landed at Madras on the 10th of May, 1822, and marched into quarters in Fort St. George. The voyage from the Cape of Good Hope had been performed in forty-eight days, and the men were in a high state of health. Within three days after their arrival, however, the cholera appeared amongst them, and it did not finally leave the corps until the 1st of July. Of 632 men, 159 were seized, and 54 died. The European women and children suffered considerably, while very few of the native camp-followers were attacked. Examples of the disease occurring in people recently come from sea, are the best that can be possibly furnished to determine the time of latent infection; for in the cases of persons resident ashore, we can scarcely ever be so

certain as to the date of their first exposure to the exciting cause.

In Hindostan, the period of latent infection seems to have frequently consisted of two or three days. A detachment of troops marched from Meerut, in 1818, to join the forces collecting at Hansi. On the 29th of July the detachment reached Delhi, where the cholera was then raging, and, having passed through the city, it encamped outside the walls. On the 31st, the men composing the detachment were attacked. In April the followers of the Governor-General's escort were first seized, three days after encamping near a diseased village. Mr. Elphinstone's party arrived in Nassick, an infected town, on the 21st of August. The party left Nassick on the 23rd, and the day after their departure a severe inroad of cholera began.

Although the miasm of cholera frequently remained latent for two or three days, the cases in which this period was observed, bear a small proportion to those apparently attacked within one day after exposure. A few of the latter may be given for an example. In Bombay, the first case was that of a man who had been on a visit to Poonah, and had passed, on his return, through Panwell, where the cholera prevailed. He died

during the day of his return. His wife, and the wife of a man who lived next door, were seized the day following. Surgeon Connell observes that a woman, the wife of a conductor in the artillery lines, was attacked. She was attended for two hours by her friend Mrs. Gray. Mrs. Gray was seized soon after this intercourse, and died the ensuing morning. The son of Mrs. Gray, a boy aged five or six years, was seized the day after his mother's death.

From the rapidity with which cholera spreads in a densely-peopled town or camp, it might be inferred that the contagion is capable of producing the disease in an exceedingly short period, at least in persons strongly predisposed to its influence. This is seen, however, in some detail facts. The Nagpore force was attacked almost immediately on its return from the siege of Chandah. Scarcely had the men taken possession of their lines, "when the cholera, like a plague, fell upon the Bengal troops and followers with dreadful havoc."

The intense predisposition manifested in these troops, as they had been previously free of disease, appears to have depended upon the fatigues of marching, and the arduous service in which they had been engaged. Among the inhabitants

of Nagpore, the cholera had existed for some time.

The attack of the Nagpore force, under the circumstances detailed in the Indian Reports, is quite conclusive that the period of latent infection is in some instances extremely short; but as the troops may, by possibility, have been exposed to the exciting cause before their arrival in the neighbourhood of Nagpore, we shall adduce an indubitable example of rapid infection. His Majesty's 41st regiment arrived in two divisions from England on the 6th and 15th of July, and marched into Fort St. George, at Madras. The men of the first division were almost immediately attacked with cholera. Those of the second division landed during its prevalence, and several of them were taken ill in the course of the morning of their landing. Of 714 men, 159 were seized, and 32 died.

We are unable to determine what is the longest period during which the contagion of cholera may lie dormant in the system. In India, while three days appeared to have comprehended, as a general rule, the time of latent infection, some cases were recorded which would favour the belief, that it may be occasionally extended to the end of a week after the first exposure to the exciting cause.

INCREASE AND DECLINE.—When cholera enters a town or a camp, its presence is first ascertained in the occurrence of one or a few cases. The cases gradually increase in number for the first week or so, after which the disease is soon developed in every direction. It prevails to a frightful extent during a week or a fortnight, according to circumstances, and then rapidly subsides, leaving the surviving inhabitants astonished at its "capricious" habits. Thus cholera appeared in the camp of the grand army on the 6th of November. By the 15th of the month it had overspread the camp. From the 15th to the 20th, its ravages were the most extensive. After the latter date it began to decline, and few new cases occurred subsequently to the 23rd.

The fact of the contagion spreading in eight or ten days, from one or a few persons, throughout a population amounting to many thousand souls, leads to a very important deduction, namely, *that the contagion of cholera is of a highly diffusible nature.* The evidence of its diffusibility does not rest upon an isolated example, as the attack in the grand army: it has been afforded in all places yet visited, and however distant from each other. For instance: in the city of Madras, the inroad commenced on the 8th of October, and subsided early

in November. In Mauritius, it commenced about the middle of November, and subsided early in January. In Shiraz, the Persian city, it commenced on the 15th of September, and subsided before the middle of October. In Penang, it commenced on the 23rd of October, and subsided in the first week of December.

The diffusible nature of the contagion being admitted, we can, with the assistance of the law of predisposition, rationally account for the phenomena of increase and decline. In every large town which has not been invaded, there will be a considerable proportion of the inhabitants in a state of predisposition. As soon as the cholera arrives, it begins to spread among the persons predisposed, and it will continue to spread rapidly until the whole of these are infected, or until such time as their predisposition is destroyed by seasoning. After this period very few cases comparatively occur, and the subjects of those that do occur are chiefly strangers who have come from a healthy locality, or residents who have had their seasoning immunity destroyed by a more than common degree of exposure to strong predisposing circumstances, as great fatigue, or great constitutional debility, &c.

One attack, however, will not uniformly secure

a town against a second. In individual cases, the seasoning may be impaired during a residence in an untainted atmosphere; and it also happens that the inhabitants of a town which has been perfectly free of the disease for several months, may lose, in consequence of this purification, the immunity previously enjoyed, and may come to suffer from a second inroad; but the first is generally the most severe.

The time which cholera occupies in running an uninterrupted course of increase and decline, has generally consisted of from two to six weeks. The length of the period in any town will depend upon a variety of circumstances, as the concentration of the inhabitants, their intercourse, &c. An efficient quarantine on houses also may shorten the attack, or a partially efficient system may prolong its duration.

Contagion.—Few questions have divided the medical world to a greater extent than those relating to "contagion" and "non-contagion." The reason of this is chiefly to be found in the difficulties which encompass the subject. The agent called *contagion*, like what is known by the name of *gravity*, eludes the cognizance of the external senses, and no medium, mechanical or chemical,

has as yet been discovered capable of detecting its presence. The existence, then, of contagion, is an inference drawn from the phenomena of disease. For example—a child having been brought into the near vicinity of a patient suffering from small-pox, (in this disease contact is not indispensable,) is attacked, in the lapse of some days, by a similar affection. The same effect follows in a number of instances, with respect to a number of children. Here the uniformity of the phenomena leads to the suspicion that the malady has been communicated from individual to individual, and it will remain for the physician to discover *how* that communication was maintained. As nothing can be seen passing from the diseased to the healthy child, it inevitably follows that the exciting cause is invisible; and as the atmosphere, immediately above and around the patient, communicates the infection, it is clear that this invisible body may be diffused through the air.

That a contagious vapour, or subtile fluid, capable of exciting the disease, emanates from the bodies of patients labouring under small-pox, is universally admitted. Regarding other diseases, however, commonly reputed contagious, a diversity of opinion has been entertained. The Egyptian plague, and typhus fever, are select in the choice

of their victims—in general they attack only a part of the population—several physicians, therefore, have denied their contagious power. This opinion was ably advocated several years ago, by Dr. Maclean; but, in the present day, few doubts, we believe, exist on the subject.

Like typhus, the attacks of cholera are chiefly restricted to persons in certain states of bodily health. These states we have endeavoured to describe under the head of predisposition; and the law being recognized, it naturally follows that many persons may be exposed to the miasm of cholera, and yet escape the disease. To this want of uniformity, in the effects which succeed to exposure, the difficulty of proving the contagious nature of cholera from individual cases, must be attributed; but as the disease has travelled over a large portion of the globe, there are other ways equally certain of arriving at a knowledge of the fact.

Before inquiring on what the propagation of cholera depends, it will narrow the question to a more tangible shape, if, in the first place, it can be shewn in some measure, on what it does not depend. Many persons suppose that the influence of the atmosphere, or of the soil, of the infected countries, is sufficient to account for the extension of cholera; but that it is altogether independent

of any sensible quality in either the soil or the atmosphere, may be made sufficiently evident.

In its general summary of facts, the Report of the Madras Medical Board observes:—

"With respect to atmospheric influence, the general historical observations which have been premised, tend to shew that cholera has neither been confined to any particular period of time, nor to any particular tract of country, but yet that it has been infinitely more prevalent at one time than at another, and in one tract of country than another. The narrative and original papers included in the present report, and the other publications on the same subject, in Bengal and Bombay, all prove likewise, that cholera is capable of exerting its influence undiminished in every state of atmosphere, so far, at least, as is evident to our senses, or determinable by instruments."

And again:—

"The wide and uniform diffusion of cholera, which we have witnessed, has taken place over countries bearing little or no resemblance to that where it originated; and their climate and seasons especially, have been altogether dissimilar. It may consequently be inferred, that the disease has either been propagated by infection or contagion; or that its progress is owing to circumstances beyond

our knowledge, thus ranking cholera amongst many other epidemics, the causes of whose origin and progress are equally unintelligible and unknown. The latter conclusion obviously leaves the question of the infectious or contagious quality of cholera undecided. The supporters of that theory object to the occult or unknown circumstances alluded to being resident in the atmosphere, forming what might be termed its choleric constitution: for, they observe, the disease in that case could not make any sensible progress directly against the continued and violent monsoon winds; nor could villages or tracts of land escape the disease when all around them were suffering from it. They confirm these arguments by the following facts:—

"Bodies of troops, in motion, have been attacked, and have retained the disease, while it was unknown to the fixed inhabitants of the country through which they passed. One, of two corps in a camp, has been attacked, and the other has escaped the disease. Ships arriving from other parts of the world, have never suffered under the assumed epidemic constitution of the atmosphere before reaching the shore. They farther urge, that the supposition of a power not infectious, existing in the air, which is capable of producing

the disease, is purely gratuitous, and has been shewn to be hardly reconcileable with our acknowledged experience. Diseases avowedly infectious, such as small-pox, measles, &c., have not at all times the power of spreading epidemically; for, while it is certain that their exciting causes are never wholly extinct, it is only at particular periods that these diseases become epidemic."

One addition will complete the circle of the preceding reasoning and evidence. It is admitted by all parties, that the cholera continued to spread among the crews of ships after they had left the ports of India. If the cause, then, of the disease be connected with the soil, how does it produce its assumed effects on the waters of the ocean? The ship Carnatic anchored in Madras Roads, the 5th of August, clean, and with a healthy crew. While at anchor, six cases of cholera occurred on board, and they terminated favourably. The vessel sailed on the 20th, with fine weather and light breezes. On the night of the 27th, a robust man, who had recovered from an attack at Madras, was re-seized, and he died at two o'clock, A.M. of the 28th. At eight o'clock, P.M. of the 29th, the joiner was seized, and he died at eight o'clock, A.M. of the 30th. At four o'clock, A.M. of the 30th, a healthy seaman, aged thirty-five years, was

seized, and he died at mid-day. In the same morning, of two lads taken ill, one died at three o'clock, and the other at six o'clock, P. M. During the succeeding night, a man was seized, and he died in seven hours. At eight o'clock, A. M. of the 31st, a stout middle-aged seaman dropped down in convulsions, and died at six o'clock, P. M. After this there were six more seizures, but the subjects of them recovered.

An exception has been taken to the instance of the Carnatic. She was bound up the Bay of Bengal, and therefore, it has been supposed by the non-contagionists, that the winds from the shore *may* have reached her. Will this, we ask, furnish a satisfactory reason for the disease becoming more virulent when the vessel receded from the shore? In harbour, the cases recovered; at sea, they were fatal. But the attack in the Carnatic is not essential to prove the general statement that the cholera is capable of extending at sea. Out of several examples we shall select one which is perfectly unexceptionable. The Topaze frigate, as formerly stated, while the cholera raged in Ceylon, left that island for Mauritius. Cases of cholera occurred at intervals during the passage; and by the date of her arrival, seventeen persons had been attacked. The distance between Ceylon

and Mauritius measures upwards of *two thousand miles*, and while holding her course, the vessel had, on either side, the whole expanse of the Indian Ocean, from Africa to New Holland.

Further testimony would cumber our pages, for it is clear, beyond confutation, that no hypothesis hitherto founded upon the known qualities of the soil or atmosphere, or founded upon any *imaginable* qualities, can even plausibly account for the propagation of cholera in Asia, Europe, and the Islands. When men of talent, therefore, who have studied the subject, doubt the existence of contagion, their doubts are to be understood simply as an acknowledgment that *they* are unable to account for the extension of the disease on the theory of contagion, or on any other theory reconcileable to the admitted facts of its history.

Now, having considered the proposition "on what cholera does not depend," one of these two alternatives remains for our adoption—either to furnish proof that cholera is propagated through contagion, or to acknowledge, with the reasonable part of the non-contagionists, that we are totally ignorant of the cause. Our conviction of the former being the correct conclusion, is strongly supported in the geographical progress of the disease. In India, most of the inland towns and

villages are seated on the banks of navigable rivers, and, accordingly, these places were at an early period invaded. The cholera ascended the rivers, "attaching itself to the ferries and market-places," and the towns situated near their margins; while the towns situated at some distance escaped for a time. "To what cause" (says the Bengal Report) "are we to ascribe this marked disposition of the disease to follow the course of rivers? This tendency was observed in so many instances, that it can by no means be considered to have been accidental. From the rise of the disorder on the banks of the Ganges and Brahmaputra, to its arrival at the mouths of the Nerbuddah and Taptee, it excited the surprise of the medical observer." To what shall we ascribe it, if not to the frequent intercourse maintained along these rivers? Through the same medium, it was propagated along the principal roads, and subjected to similar peculiarities. Had the miasm been atmospheric, it would have passed over the country, "as the crow flies," and the towns in its line of route would have been always infected in succession, according as they were more or less distant from the original focus of the miasm. But a large army encamped on the banks of the Sinde, and in constant communication with

Bengal, receives the disease before the cities to the east of the Ganges, which are less distant. From Etawah, the cholera travelled to Futteghar, without infecting many of the intervening villages. From Agra, it travelled to Delhi, and the towns and villages between escaped, although they are situated low, and exposed to noxious effluvia. From Husseingabad, it travelled to Nagpore, and the town of Baitool, which stands on the main road, remains untouched. Nagpore and Mooltay are above sixty miles apart, and the cholera passed from one to the other without entering the intermediate villages. Further south, also, many towns were infected, not in succession according to their distance from the place where the distemper prevailed, but according to the extent of their intercourse with that place. Thus the disease travelled from Jaulnah to Punderpoor, and from Madras to Trichinopoly, long before it could extend to places of minor resort, which were within half the distance.

Moreover, shewing that cholera may be transported in the human body, and propagated from that source, the commencement of the inroad has coincided with the arrival of persons from infected places, and these persons and their families and neighbours have been the first to suffer. On this

head, we shall quote from the Report of the Madras Medical Board:—"There are several instances recorded, where the cholera has been first manifested at a place, in the attack of an individual who had come from some other place where the disease existed. The first case of an European, which occurred at St. Thomas' Mount, was of a man who had left Madras on the morning of the 15th of October. Proceeding on his journey towards Trichinopoly, in the evening he was taken ill about a mile from the Mount, brought back to the house where he had passed the day, and there died. On the 17th, the wife of that person—on the 19th, the owner of the house—and on the 21st, his wife—all experienced attacks of cholera, but recovered. Several of the native servants also suffered. The instances of the disease appearing at places immediately after the arrival of corps and detachments, which were suffering from it, are very numerous. For example, it appeared at Jaulnah, immediately after the junction of a party from Nagpore, amongst whom it prevailed. It appeared at Aurungabad, and at Mulligaum in Candeish, after the arrival of parties who had left Jaulnah at the time the disease was prevalent there, and amongst whom it had broken out on the march to these places. It appeared a second

time at Mulligaum, after the junction of the first battalion, 5th regiment, in which cholera prevailed. It appeared at Secunderabad after the arrival of a detachment suffering from it; and it appeared afterwards in the villages through which the detachment had moved. It appeared at Ghooty, where no case had been observed for six months before, immediately after the arrival of the first battalion, 16th regiment, in which it prevailed with great mortality. It is remarkable, that the same formidable type of the disease which prevailed in the marching corps, was communicated to the corps at Ghooty. It also spread on that occasion to the adjacent villages. It appeared in a detachment of artillery, previously perfectly healthy, upon their encamping on the ground, which had been immediately before vacated by the first battalion, 8th regiment N. I. in which corps the disease prevailed: the bodies of several persons, who had died of cholera, remained exposed on the ground, when it was taken up by the artillery. Moreover, marching corps and detachments have been seized with cholera on coming to places where it was prevalent."

To diminish the weight of these ascertained facts, the non-contagionists have adduced many instances where individuals and bodies of men have

escaped contracting cholera, under circumstances apparently analogous to the foregoing; and they have also adduced instances where the introduction of cholera could not be traced to the arrival of persons from districts previously infected. The facts, however, remain unaltered: and we cannot see any force in this negative evidence. Contagion is a subtile agent. Many peculiarities which favour its extension or suppression will be concealed in the imperfection of our senses; and frequently the manner in which it gains admission to a camp or a town will baffle all inquiry, and more particularly the superficial inquiries generally instituted on such occasions. The same happens, moreover, with regard to small-pox, whose contagious property no one doubts. In England it is of common occurrence, that the attack cannot be traced to exposure, although exposure was undoubtedly sustained.

The difficulty of discovering the source of individual attacks often originates in the insulated existence of the contagious body itself. The vapour which emanates from patients in small-pox has not only the power of exciting the disease at the period of its emanation, but it may actually lodge in the walls of an ill-ventilated apartment, or accumulate in the patient's bedding and clothes,

so as to form *foci* of infection after the disease has completely disappeared. The time, during which the vapour is able to retain its infecting power in this insulated state, will chiefly depend on external circumstances; for it is well known that contagion may be destroyed, or at least dissipated and rendered inert, by the currents of air and light admitted in free ventilation, and the operations of cleansing, as the washing of clothes, white-washing of walls, &c.

Many physicians are of opinion, there is not any evidence which would warrant the inference, that the contagion of cholera may retain its infecting power in the insulated state.* We cannot subscribe to this conclusion. The Medical Board of Bombay state in their report—"It appears to us that it is capable of being transported from one place to another, as in cases of ordinary contagion or infection." And Mr. Jukes observed, when the cholera had almost disappeared at Tannah, that nine cases occurred in succession in one apartment of the barracks. As the disease had subsided elsewhere, this looks very like the

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* An able foreigner, Moreau de Jonnès, who has been long engaged in observing the phenomeua of cholera, is of opinion that its contagion may be conveyed in goods.

harbouring of infection. Mr. Jukes had the apartment scoured and fumigated, after which no other case occurred. In Samulcottah, the disease commenced immediately after the arrival of troops, and first among the people who had associated with them. The troops had not suffered from cholera on their march, but Surgeon Wight remarks, "they might not have had cholera actually raging amongst them, although its fomites were present and ready to be called into action, whenever favourable circumstances occurred." During the early progress of cholera, large bodies of troops, though in good health previously, seldom performed a march in Hindostan without being attacked. The contagion was probably carried with them, and as soon as the fatigues of marching formed the predisposition, it overpowered the resistance of the constitution. According to Surgeon Chalmers, "travellers seem on all occasions to be more obnoxious to its attack than residents, and seem capable of carrying with them, to a considerable distance, a sort of infected cholera atmosphere." The second battalion of the 23rd regiment of Native Infantry, on its march from Cannanore to Nagpore, experienced a very fatal invasion on the road between Ghooty and Hyderabad. The cholera commenced in November,

and by the end of the month 150 men had been carried off. In December only 14 died. Here the operation of a specific cause apart from the atmosphere, was evinced in the fact, that a considerable detachment from Madras, which followed one or two days' march in the rear of his corps, during the period of its greatest suffering, escaped the disease altogether.

Independent of direct evidence, however, analogy would warrant the inference, that the contagion of cholera may retain its infecting power in the insulated state. It is a general law with respect to the contagions of other diseases. Moreover, this might be inferred from some of the most striking features in the progress of cholera. The progress of cholera in Persia, and other countries distant from Hindostan, and consequently beyond the range of the influence which originally produced it, is to us decisive of the question. Many districts, after having been for a time free of cholera, have come to suffer again and again, without a fresh importation of the active disease.

Although the contagion of cholera may exist in the insulated state, it will seldom be able in this state to retain its infecting power during a long journey, unless renewed from time to time by the occurrence of the disease. The diffusibility of its

nature, which favours its growth and extension in a town, will tend rapidly to destroy it when apart from the sources of production. Even stationary, as in a city, upon the cessation of an attack, it is probable that the insulated contagion soon dies out among the inhabitants, who are clean in their persons, and who live in well-ventilated apartments; and that it is chiefly preserved amongst the poor, who are dirty, and who live cooped-up in filthy hovels, the interiors of which never saw the purifying light of day.

Enough, we think, has been already said to justify us in assigning a contagious property to cholera; but before leaving the discussion, we shall adduce two general facts, which are of themselves sufficient to support this opinion.

The first is connected with the local progress of the disease, as when it begins in a camp or a town. Here, its first appearance is announced in the attack of one or of a few individuals, and the number of the cases *gradually* increases. This course cholera has universally pursued. Now, had the cause of the disease been generally diffused in the atmosphere of the camp and town, would not great numbers of the people have been attacked, almost immediately, on the occurrence of the first case?

The second general fact is the following:— Among the islands of the Indian Ocean, it was observed that the cholera uniformly commenced its ravages in the sea-port towns, or in those towns seated a few miles inland, which have a constant intercourse with their harbours at the shore. In the island of Mauritius, the disease first appeared in the town of Port Louis. In Bourbon, the town of St. Denis was the first attacked. In Java, the town of Samarang, and so of the islands Sumatra, Penang, Borneo, Celebes, Lucon, &c. In the Persian Gulf, also, the same order of infection was observed. Muscat, the principal trading port town, first received the disease. Then, the port of Bahrein, and Busheer and Bassora. How can this extraordinary and uniform partiality which the cholera exhibited in its choice of sea-port towns for its first inroad, be explained, unless on the principle of imported contagion!

QUARANTINE.

The interests of a commercial country require that vessels should enter and depart from its harbours without let or impediment—for the interposition of a very slight delay, may completely alter the character of a mercantile speculation, and the interval of a single week may convert a valuable article of import into an unmarketable drug. In such a country, therefore, no regulations restrictive of the freedom of maritime enterprise should be adopted without the strongest plea of necessity, and the best-founded assurance that they are likely to prove adequate to the accomplishment of their object. If injudiciously framed or imperfectly executed, they merely serve to aggravate the evil they were intended to prevent. These observations are peculiarly applicable to the quarantine laws, the operation of which is not only detrimental to property, but productive of very serious annoyance to individuals, by the sacrifice they are obliged to make of their personal liberty to the general safety.

The progress of the Eastern Pestilence, and the evidence of its contagious character, leave no doubt of the propriety of submitting to many inconveniences for the purpose of staying its approaches to our shores. No rational means should be left untried to bar the introduction of so terrible a scourge—and as the magnitude of our dealings with foreign countries tends at once to augment the peril from the disease, and the pecuniary loss incidental to the adoption of sanatory precautions, it is manifestly unwise to have recourse to these precautions at all, unless they are based upon sound principles, and scrupulously carried into effect.

The efficiency of quarantine regulations will depend upon their being adapted to the nature and laws of the agent they are intended to exclude. If the lurking poison long retain its power under circumstances unfavourable to its developement, then must the term allotted to the purifying process be proportionally protracted. For persons in apparent health, the quarantine must always exceed the longest probable period of latent infection. The time apparently necessary to destroy or dissipate the insulated contagion, is the point by which the detention of goods ought to be determined.

Although goods from infected countries be uniformly subjected to the purifying process, it by no means follows, that these goods contain a particle of contagion. Indeed, it will not generally happen that the common articles of merchandize should have come within the infecting range of a person labouring under a dangerous and rapid malady; or if they have, that they will retain the noxious vapour through the various degrees of atmospheric exposure which they undergo previous to exportation; as they *may*, however, be infected, prudence inculcates the propriety of guarding against the contingency; and with this view, the purification of goods constitutes a part of every rigid sanatory system.

The articles most liable to suspicion are those which might be applied to the service of a patient suddenly attacked—such as temporary bedding, covering, or other personal convenience. Soft and elastic substances, as wool, hemp, and cotton, are of this kind. The texture, moreover, of these substances, is considered peculiarly favourable to the retention of infection.

But the danger to be apprehended from the common articles of merchandize is small, compared to that which may be expected from the ordinary clothing and bedding of persons coming

from the sphere of contagion, Many of these stuffs have probably been exposed to the taint of infection for a considerable time. Some of them may have been worn or lain upon by patients in severe symptoms, or during the progress of recovery; and they may possess an infecting power over strangers, although their owners wear them with impunity.*

Goods arriving in English ports are submitted to the process of purification on board of ships called "floating lazarèts." These are old vessels of war, fitted up for the quarantine service, and stationed at Standgate Creek, &c. When a trading vessel arrives from a place infected, she is ordered to the quarantine station, where the suspected por-

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* An extraordinary Medical Committee established at Moscow by order of the Emperor of Russia, were of opinion that goods could not communicate the infection of cholera. They argued, "that convalescents have continued to wear clothes which they wore during the disease, even furs, without having been purified, and they have never had a relapse."—*History of the Epidemic Spasmodic Cholera, by Bisset Hawkins, M. D.*

This is a good specimen of the manner in which a scientific question is settled by a *majority*. Had the committee been aware of the law of predisposition, they would have known that to contract the disease a *second* time was rather an unusul occurrence.

tion of her cargo is taken out and removed to a floating lazarèt. In the lazarèt, it is opened up and exposed between decks to the fumes of chlorine, and to the currents of air admitted through the ship's ports.

This does not appear to be the most efficient mode of purification that might be adopted. As the operation is conducted *between* decks, there is not a liberal admission of *light*. Now, we would place more dependence in the powers of light as a disinfecting agent, than in those of chlorine.—Light and heat (apart from moisture) are two of nature's chief disinfectants; and it may be presumed, that they are energetic. It is very doubtful if chlorine have any power to neutralize contagion itself, though it may have power over the elements of which contagion is composed. The result of continental practice does not seem favourable to chlorine.

The plan which we would recommend for the purification of goods, (probably a much cheaper one than the present,) is the following :—

Let temporary wooden buildings be erected. Let these buildings be kept constantly heated in the interior, and let them be provided with the means of being opened on all sides, so as to admit of the free ingress of light, and unimpeded venti-

lation. It may be assumed that contagion is a gaseous compound, and the probable advantages of the preceding plan would be—that the heat would expand the contagious vapour, and the air, admitted in free ventilation, would be the more likely to dissipate it. The heat and light together would favour its decomposition. The fumes of chlorine might be added, if thought serviceable.

The period most favourable to the introduction of cholera into England has not yet arrived. It is when the disease reaches the opposite coast of the Continent, that this calamity is to be particularly apprehended. The quarantine restrictions on the person should then be doubly vigilant, and their duration, perhaps, never under twenty days.*

While the cholera was limited to the ports in the Baltic, the probability was, that vessels trading to these ports would seldom reach the coast of

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* Twenty days is probably the longest term that can, in reason, be imposed upon persons in apparent health; but when persons arrive from infected places, with symptoms of common fever, or affections of the bowels (as dysentery, diarrhœa, &c.), appearances which *chronic* cholera often assumes, the period of their quarantine must be extended to the complete cessation of these symptoms, and until twenty days have expired after their complete cessation.

England, with the acute disease actually existing on board. Such vessels contained few hands, and they lay for a considerable time in the infected harbours. The persons, therefore, who were in a state of predisposition, would in general be carried off before the vessels left these harbours.

But it will, in all likelihood, happen otherwise, when the cholera appears in the adjacent ports of France and the Netherlands. The intercourse between them and England is constant, and the voyage extremely short. In addition to the intercourse maintained by trading vessels, numerous passengers will be arriving in steam-packets from these countries. Now, should cholera break out on board of the latter during the passage, or while they are performing quarantine, how will the present precautionary system operate?

Sanatory regulations ought to be framed so as to protect the public interest, with the least possible injury or distress to the individuals falling under their supervision. When, then, one or two cases have occurred on board a vessel crowded with passengers, will it not be cruel to compel the healthy persons to remain on board *that* vessel during a long period of quarantine, exposed to the contagion, and under the depressing influence of fear and confinement? Should not a

plan be devised for separating the healthy from the sick?

When the period of quarantine has expired, we think, that before the suspected persons are permitted to go at large, their wearing apparel should be submitted to free purification: and, in addition, that they themselves, before resuming their purified dress, should undergo the cleansing of a bath—for, if the contagion have adhered to, and been preserved in, their clothes, may it not also adhere to the surface of their bodies?

In leaving the subject of cholera, for the present, it grieves us that we cannot entertain the opinion expressed by some able writers, that the salubrity of our climate is capable of moderating the virulence* of the disease. During the lapse of

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* Since the cholera appeared in England, the inhabitants have congratulated themselves on the *mild form* which the disease has assumed. In this they are not supported by the facts. Fewer persons have been attacked here than in most other countries, but the virulence of the disease is undiminished. One-third, or one-half, of all seized have perished. By the newspapers, however, the popular error is perpetuated. When a place is first invaded, an announcement usually appears in their columns, such as—"The cholera has appeared in our native city, but fortunately in a mild form—twelve persons have been attacked, and *only eight* have died"!

fourteen years, the symptoms have retained their original malignity, uninfluenced by the seasons, in every part of the globe hitherto invaded. The large and numerous cities and towns of Great Britain—their dense population, divided in a great measure into two classes, the rich and the poor—the former debilitated by luxury, the latter by poverty, and the unhealthy labours of manufac ture—prepare a field, to all appearance, the most fitting for the destructive ravages of the contagious cholera. We indulge, then, the hope, that His Majesty's Government, while engaged in the stormy politics of this period, will not forget the magnitude of the pestilential danger; and that every sanatory precaution will be enforced, which can rationally be expected to strengthen the natural advantages bestowed upon the country by its insular position.

REMARKS

ON

THE CHARACTER AND TREATMENT

OF

THE CONTAGIOUS CHOLERA

IN

ENGLAND.

SECTION IV.

Arrival of the Cholera in England, in the Autumn of 1831.—It appears to spread slowly.—Progress in Sunderland, Newcastle, and Gateshead.—Mode of Propagation.—Comparative number of Burials in this and preceding years.—Virulence of the fully-formed Disease not diminished during the local inroads.—Difference of Predisposition in Age and Sex.

SINCE the preceding pages were laid before the public in a first edition, the contagious cholera entered England, making its first appearance during the autumn of 1831, in the town or neighbourhood of Sunderland, a sea-port situated in the county of Durham. Shortly previous to the time in which the disease was observed at Sunderland, it had spread to the city of Hamburgh, on the opposite coast of the Continent. I shall not now stop to inquire minutely into the way in which the cholera reached our shore; for its recent extension to some of the principal cities and towns in England and Scotland, renders

it proper that I should give early* publicity to the results of my practical observations on the character and treatment of the disease in this country. Hereafter I shall probably take an opportunity to speak of the evidence in favour of the cholera having been imported† from infected places, and

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* This new portion of the work—nearly in its present shape—has been for a considerable time ready to go into the hands of the printer; but it was delayed in appearing before the public, by the circumstances which forced upon me the necessity of changing my publisher.

† Some people are at a loss to conceive how the disease could be imported, in defiance of quarantine; but the following sample of its efficiency in England may probably explain. During last summer, pilots and other boatmen, belonging to the port of Sunderland, were in the habit of holding secret communication with ships in the Channel, that had recently taken their departure from Continental ports where the cholera prevailed, and before these ships were submitted to quarantine. A knowledge of the existence of this dangerous intercourse reached the magistrates of Sunderland, and they addressed a letter on the subject to the authorities in London. In substance, their letter stated—"As the cholera was prevalent in Riga, and other ports of the Baltic, a vessel of war should be sent down to cruize off the port of Sunderland, in order to put a stop to this clandestine intercourse from the shore, and to enforce the observance of quarantine. They also requested to be authorized to direct the coast guard to act in such a manner as might tend further to protect the shore from the risk of infection." This letter of the

also of the evidence which tends to show that it has been since propagated in different parts of the island by its contagious property.

Before attempting to describe the proper characters and treatment of the cholera in England, I think it necessary to allude to the opportunities which I have possessed to qualify me for entering on the task.

When the report of the existence of the foreign malady in Sunderland had excited the attention of the public, I left London, in order to examine

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magistrates was dated June 18th, 1831; but the assistance of a vessel of war, which was prayed for therein, was not granted until the *middle of November*—several weeks *after* the Government reports had announced the arrival of cholera in Sunderland itself!!

Vessels, moreover, coming from Sunderland, and other infected ports of the provinces, to London, had to undergo a quarantine of *ten days*, to be reckoned from the date of their departure. The utter folly of prescribing the period of ten days, as a measure likely to exclude persons suffering under some of the symptoms, is apparent in the circumstance, that a patient may have the pestilential diarrhœa for *fourteen days*, and his general health be still unimpaired. Such a person could pass, with his complaint undetected, through the ten days' quarantine, and afterwards spread the disease. If quarantine cannot be rendered, at least in theory, efficient, it should be completely abandoned, and not retained as an instrument only capable of ruining our merchants, &c.

into the cause of their alarm; and having reached the north of England, I continued to prosecute my studies, in Sunderland, Newcastle, Gateshead, and other parts of the infected districts, during the period of three months and upwards.

To ascertain whether the cholera, which prevailed in Sunderland at the time of my arrival there, was of the nature of the Indian pestilence, became the first important consideration; and, in a short time, I was enabled to satisfy myself of the fact, that, although the disease had been modified in some of its symptoms, during its transit from India, westward, it retained features sufficiently striking, to lead any impartial observer, qualified for giving an opinion, to a belief in its Asiatic origin.

One of the most remarkable modifications which the character of the disease shewed, and apparently from the influence of the cold atmosphere of the winter of high latitudes, and the very limited predisposition on the part of the people, was the slowness of its increase. After appearing in Sunderland, instead of spreading rapidly, and running through its course of increase and decline, during the first three or four weeks, as in hot climates, it presented, at the end of that period, but a very limited number of attacks, if we may depend upon

the published cases as being the full amount—and I have no reason to suppose them far wide of the truth. The case of cholera forming the first link in the continued chain of the local inroad at Sunderland, occurred on the 24th of October, in the person of a man named William Sprouts. One or two insulated attacks, however—cases from which the disease did not spread—are said to have been noticed before this; and probably, that of Robert Henry, a pilot, who died about the middle of August, was an example of these. Henry, the day before he took ill of cholera, had piloted a foreign vessel that had come from an infected port of the Baltic, and that had been in quarantine.

As the predisposition to cholera has been as yet confined to a limited portion of the people in England, cases, apparently insulated, will occasionally occur. A patient, for instance, who leaves a diseased district, while suffering under incipient symptoms, and removes to a healthy locality, may die of the malady in the latter, without infecting any of the persons who have attended upon him. This evidently results from the circumstance, that not one in forty or fifty of the inhabitants of a town have, in general, been found susceptible of the infection; and, therefore, no medical man ac-

quainted with the past history of the contagious cholera, will hold the development of the spreading effect in every instance as essential to mark the identity of the disease.

The returns that have been made, by order of the government, to declare the number of cholera cases that occur in any town or district, will not enable us to discover the numerical ratio of infection. The reason is, that in England the more alarming symptoms have usually been preceded by a diarrhœa of longer or shorter duration. The diarrhœa, consequently, where it is an effect of exposure to the cholera miasm, is an early form of the pestilential disease; and, in order to furnish the true ratio of increase and decline in this country, all cases that happen to be cured in the premonitory period, should be regularly reported. Many difficulties, however, stand in the way of obtaining such reports. The premonitory symptoms, under proper treatment, are removed with facility; and cases of this nature occur in great numbers, so that they are passed over by the practitioners and by the patients, as unworthy of any, save very temporary notice.

The progress of cholera in Sunderland, according to the daily reports which were published there, was as follows:—

	New Cases.	Recoveries.	Deaths.
1831.—October 24th	1	0	0
26th	0	0	1
31st	4	0	3
November 1st	1	0	1
6th	6	0	2
7th	2	0	5
8th	7	1	3
9th	7	0	4
11th	5	2	2
12th	4	0	0
13th	1	2	2
14th	11	3	3
15th	10	4	6
16th	8	2	6
17th	8	4	1
18th	13	8	5
19th	11	5	1
20th	8	3	3
21st	6	3	6
22nd	13	5	2
23rd	8	4	5
24th	6	5	5
25th	11	5	3
26th	14	4	5
27th	10	5	4
28th	14	6	8
29th	12	5	7
30th	13	3	4
December 1st	8	3	5
2nd	17	10	1
3rd	7	4	6
4th	5	6	2
5th	5	6	2
6th	8	4	6
7th	7	1	2
8th	19	1	7
9th	10	3	9
10th	17	23	4
11th	10	9	5
12th	9	9	6
Carried forward	336	158	152

	New Cases.	Recoveries.	Deaths.
Brought forward..	336	158	152
1831.—December 13th	8	10	3
14th	7	8	2
15th	8	5	2
16th	14	6	8
17th	17	5	3
18th	8	4	7
19th	4	8	7
20th	2	6	2
21st	2	1	2
22nd	3	2	2
23rd	3	1	1
24th	5	1	3
25th	3	1	1
26th	0	2	1
27th	2	1	0
28th	1	0	1
29th	1	1	1
30th	1	2	1
31st	0	0	1
1832.—January 2nd	0	2	0
3rd	1	0	1
5th	1	0	0
7th	0	1	1
Total Cases..	427	Recovs. 225	Deaths, 202

The most remarkable feature in the daily reports, is the fluctuation in the number of the cases; and, as was previously remarked, they can be of no use in calculating the ratio of increase and decline, or of showing in what proportion the inhabitants of the town were infected. An attempt, it is true, was made at one time, to have the premonitory cases returned—those, at least, commencing with diarrhœa—but the returns of such

were discontinued soon afterwards, having been furnished only from the 10th to the 24th of November, a period of eleven days. Even for this period they cannot be depended upon, as remotely indicative of the number of persons affected with the pestilential diarrhœa—for some of the local practitioners, who could not perceive its object of utility, declined reporting any of the premonitory cases.

The Cases of Diarrhœa reported were:—

	New Cases.	Recoveries.	Deaths.
1831.—November 11th	14	0	0
12th	11	5	0
13th	4	8	0
14th	13	5	1
15th	10	10	0
16th	15	1	0
17th	10	11	0
18th	8	10	1
19th	14	12	0
20th	4	10	1
21st	9	7	0
* Total of Diarrhœa Cases within the above period,	112	79	3

Total of Recoveries and Deaths 82
Remaining on the sick list, Nov. 21st, 30

Total.. 112

* In the aggregate report published by the Central Board of Health, these diarrhœa cases are enumerated as "*cholera.*" Here I have placed them apart, for the sake of general accuracy, and more particularly because, in their union, the comparative mortality among the fully-formed cholera cases would appear to be much lower than the true amount.

By this imperfect return, we find that the number of diarrhœa cases exceeded those of the distinct cholera cases, for the same period of time. After deducting, from the sum total, the three fatal cases—which, in all probability, should have had a more serious designation than "diarrhœa"—the former will amount to 109; while the latter is 85. It would be desirable to discover the proportion which the patients, affected with premonitory symptoms, bear to those who suffer under the marked disease. As far as I am able to judge, the premonitory cases considerably exceed, at all times, the others, and are in the proportion of two and three to one, or perhaps above this.

When the progress of cholera is estimated by the number of the severe cases that occur within a certain space of time, the disease has appeared to spread less slowly in one than in another locality. Newcastle and Gateshead furnish the example.

Local progress of Cholera in Newcastle:—

	New Cases.	Recoveries.	Deaths.
1831.—On, and previous to December 9th	7	0	4
10th	2	0	2
11th	2	0	1
12th	7	1	2
13th	16	1	3
Carried forward	34	2	12

	New Cases.	Recoveries.	Deaths.
Brought forward,	34	2	12
1831.—December 14th	14	0	3
15th	15	2	10
16th	13	2	6
17th	20	7	5
18th	11	3	2
19th	7	19	5
20th	11	9	7
21st	30	12	4
22nd	11	7	6
23rd	13	14	2
24th	12	10	7
25th	21	6	9
26th	16	8	6
27th	20	9	10
28th	39	9	6
29th	22	15	8
30th	32	23	11
31st	23	7	4
1832.—January 1st	57	14	11
2nd	18	12	6
3rd	45	26	11
4th	29	19	6
5th	10	5	5
6th	47	45	11
7th	19	19	8
8th	29	24	9
9th	10	9	2
10th	13	15	6
11th	20	16	7
12th	14	16	6
13th & 14th	27	22	2
15th	16	18	5
16th	21	21	12
17th	15	9	4
18th	20	12	6
19th	8	8	7
20th & 21st	20	9	9
22nd	1	11	0
23rd	22	8	3
24th	14	3	2
Carried forward,	839	505	261

	New Cases.	Recoveries.	Deaths.
Brought forward, ..	839	505	261
1832.—January 25th	9	 20	 7
26th	9	 10	 3
27th & 28th	20	 16	 9
29th	7	 8	 1
30th	5	 10	 4
31st	8	 4	 1
February 1st	6	 14	 4
2nd	1	 10	 0
3rd & 4th	12	 10	 1
5th	4	 5	 1
6th	2	 5	 0
7th	2	 2	 0
8th	5	 5	 2
9th	4	 2	 1
10th & 11th	1	 8	 0
12th	1	 1	 0
13th	2	 1	 0
14th	1	 1	 1
15th	6	 5	 0
16th	2	 1	 1
17th & 18th	3	 4	 0
19th	4	 0	 2
20th	2	 2	 1
21st	1	 1	 0
22nd.....	2	 0	 2
23rd	2	 1	 0
24th & 25th	1	 4	 0
26th	0	 1	 0
27th	1	 2	 1
28th	1	 0	 0
29th	1	 0	 0
March 1st	2	 0	 0
2nd & 3rd	3	 3	 1
4th	0	 1	 0
5th	0	 1	 0
6th	1	 0	 0
8th	1	 0	 0
9th & 10th	0	 2	 2
11th	1	 0	 0
12th	0	 0	 1
Total of Cases	972	Recovs. 665	Deaths 307

Local Progress of Cholera in Gateshead.

	New Cases.	Recoveries.	Deaths.
1831.—December 14th	1	0	0
15th	0	0	1
25th	2	0	2
26th	40	0	10
27th	59	8	32
28th	44	12	13
29th	29	15	8
30th	39	16	3
31st	20	22	8
1832.—January 1st	20	9	1
2nd	18	15	8
3rd	16	11	5
4th	25	11	5
5th	15	19	9
6th	8	22	7
7th	6	29	6
8th	7	3	2
9th	11	3	5
10th	9	12	1
11th	1	8	1
12th	2	2	2
13th	0	8	2
14th	5	5	1
15th	2	0	1
16th	2	8	0
17th	0	1	1
18th	0	3	2
19th	2	0	1
20th	1	0	1
21st	1	1	0
22nd	2	0	1
23rd	1	1	0
24th	1	0	2
25th	2	1	1
26th	2	3	0
27th	0	0	1
Carried forward	393	248	143

	New Cases.	Recoveries.	Deaths.
Brought forward,	393	248	143
1832.—January 29th	0	0	1
30th	1	0	0
February 1st	7	0	0
2nd	1	1	1
3rd	1	3	1
4th	1	2	0
5th	1	2	1
6th	0	2	0
Total of Cases	405	Recovs. 258	Deaths 147

As they are merely separated by the river Tyne, and have constant communication by the bridge which crosses that river and unites them, Newcastle and Gateshead may be considered portions of one town. The continued inroad of cholera commenced in Newcastle the 7th of December. In Gateshead, with the exception of a straggling case or two, the disease did not begin to spread until the 24th of the month. During the first week of the inroad in Gateshead, there were 251 well-marked cases among a population of 15,000, whereas in Newcastle, among a population of 42,700, there occurred only 248 cases during the first three weeks of the invasion.

The comparatively rapid extension of the cholera in Gateshead, has been advanced to show that the disease is not always propagated in this country

through contagion.* The occurrence soon after the onset of the attack of forty or fifty cases daily, is, to professional men adopting this opinion, conclusive evidence of the operation of a remote cause generally diffused in the atmosphere of the locality, and therefore capable of producing its morbid effects simultaneously in various streets. A glance at the sum total of the cases, and their quick succession, may, indeed, seem to favour this view; but a scientific question of so much difficulty and importance cannot be correctly decided upon superficial appearances, however specious. We know from the whole history of its geographical progress, that the spreading of cholera is indepen

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* I need scarcely observe, that, throughout the volume, the words *contagious* and *infectious* are used as synonymous, in accordance with the practice of the best writers. Giving them different significations is one of the errors which have involved medical men so often in a mere "war of words;" for, even in the limited sense, an infectious disease must necessarily be contagious; and some diseases that require contact for their propagation at one time, may, at another, be propagated without it.

The public have, in some way, become possessed of the idea that the word *epidemic* implies a non-contagious disease; but this is a mistake. By calling a disease simply "an epidemic," we are not informed whether it is contagious or not—it may be either.

dent of every state and change of the atmosphere, that may be appreciated by our senses, or by the most delicate instruments. It penetrates a country in the course of, and against, the strongest winds, with equal facility; it extends under every degree of temperature, included between the extremes of tropical heat, and the intense cold of a Russian winter; and under every degree of dryness and moisture common to the swampy soil and rainy seasons of Bengal, and to the parched and sandy surface of Arabia. With a knowledge of these circumstances, it must be admitted, that not any one of the states described, is essential to the propagation of cholera; and, in case the hypothesis of contagion is supposed to be insufficient to explain the whole of the phenomena, that their true cause, whose laws are different from those of admitted contagion and of malaria, is anomalous, and altogether unknown.

Before recognising the existence of a new and anomalous cause for the propagation of disease, an observer who labours rather to discover truth, than to maintain preconceived and doubtful opinions, will cautiously investigate, and dispassionately record all the facts which incline to contagion, as well as those which seem to militate against it; and having weighed these facts in opposing scales,

he will then be qualified to consider the merits of the question at issue. With such an observer, the comparatively rapid progress of cholera in Gateshead is of small value in determining its mode of propagation, provided, upon inquiry, he has ascertained that the early cases occurred in persons who had been attacked soon after they had intercourse with infected places in Newcastle, or elsewhere. To trace the history of the cases individually, however, is a work of extreme toil, and rather than undertake it, many writers would draw their conclusions from less important data.

As it was the only course in which a rational conviction might be found, my attention, while a sojourner in Gateshead, was particularly directed to the investigation of the earliest cases of cholera that had been noticed; and the result of the investigation left no doubt upon my mind, of the disease having been propagated through Gateshead in a way perfectly analogous to that in other localities, where its progress, notwithstanding, had been uniformly slow. The first case was in the person of Mrs. Hindmarch, who was attacked on the 14th of December. The particulars of her case I published soon after it occurred, and I shall now quote them from the periodical in which they were detailed.

First Case of Cholera in Gateshead.

Mrs. Hindmarch lived at the Bottle Bank, a place in the near vicinity of Hillgate and Pipewellgate, afterwards the strongholds of the cholera in Gateshead. Her occupation was that of a dealer in old clothes and shoes, and she had much intercourse with the poorest classes; was not an habitual drinker, but the Tuesday previous to her death, she came home in a state of intoxication. On Wednesday, December 14th, she resumed her avocation, and during that day she visited some of her business acquaintances in Sandgate, Newcastle, where the cholera was then prevailing. After returning home in the evening, to Gateshead, she expressed her surprise at the havoc which the disease was making in Sandgate, and the miserable appearance which the sick, and the frequent funerals, presented. About eleven o'clock of that night she was seized herself with symptoms of cholera, and on Thursday, the day ensuing, she died.

Joseph Hindmarch, the husband of the above, was compelled, soon after her death, to change his lodging, as the owners of the house in which he lived were afraid of being infected. The 18th of December, he removed, with his daughter, to

Peverly's house, in Oakwellgate, a quarter of the town which is high and dry, and which had been previously free of cholera. Mrs. Peverly was sister-in-law to Hindmarch. The Peverlys insisted upon Hindmarch having his bedding washed before it was brought to their lodgings; a chest of clothes, however, was admitted, without having undergone any process of purification beyond a hasty rubbing, applied to the outside of the chest. During the day of his coming to Peverly's, Hindmarch complained of a slight affection of his bowels, but it subsided without medical treatment. He continued for several nights to sleep in an inner room, in the same bed with a son of Mrs. Peverly, and his chest of clothes was laid alongside the bed. During Monday, December 26th, the young man who had been most in the habit of sleeping with Hindmarch, was seized with cholera—then Peverly, the father, was attacked—and, on the same day, another son, who had slept with Hindmarch, and who had left home the preceding day, to enter upon his work at Shields, was seized there of a similar disease. The son first attacked, died on Monday evening—the father died on Tuesday—and the second son, whose case seemed hopeful in the early stages, having received a letter detailing the circumstances of his

brother's death, sank rapidly afterwards, and died at Shields, on Wednesday. Mrs. Peverly ascribed the deaths of her husband and two sons to the accident of Hindmarch coming to reside with her, and she therefore compelled him to leave her house.

*John Hindmarch, smith, son of the deceased Mrs. Hindmarch, resided, with his wife and three children, in a new house, distant about thirty yards from the Peverlys'. He was down at the Bottle Bank before his mother died, and he also attended her funeral on the 16th of December. He was greatly alarmed for cholera when the Peverlys took ill. He visited their house once or twice, with his wife, and he went to their funerals. Both complained, about the end of the week, of diarrhœa. He was seized, the 2nd of January, with violent symptoms of cholera, and the attack proved fatal.

William Hindmarch, another of the family, attended the funeral of his mother, and those of

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* For the particulars of the succeeding cases I was indebted to the industry and kindness of my friend, the Rev. G. C. Abbs, curate of Gateshead parish. Mr. Abbs entered on his labours spontaneously, and his expected reward was in the hope of advancing the interests of science, by collecting the facts, regardless of opinions.

the Peverlys. Was seized soon afterwards with diarrhœa and vomiting. He obtained early medical advice, and recovered.

Christopher Peverly, brother of the young men who had died of cholera, was seized about the period of their funerals, with diarrhœa. He received medical aid at the hospital, and recovered.

Mrs. Mash, in whose house, at Shields, John Peverly died, December 28th, took ill the Sunday following, and died on Monday.

Hannah Lethrad, a widow, aged sixty-six, resided in a house adjoining the Peverlys', and separated from it only by a narrow passage. In passing their door Mrs. Lethrad used to inquire after the cholera patients, but did not go into the sick apartment. She was attacked during Wednesday, the 28th, and was taken to the hospital, where she died.

Dorothy Comey, aged fifty-three, resided near the Peverlys, and was acquainted with them, but was not observed to visit them when ill. Mrs. Comey knew also Joseph Hindmarch, and she was seen talking with him in Singlewood's shop, the day after his wife's funeral. The conversation was about it. Mrs. Comey was attacked with cholera, the 26th of December, and she died the 27th.

William Wheatley, a strong, healthy man, aged thirty-two, resided in Oakwellgate. He attended the funeral of Mrs. Hindmarch, and acted as under-bearer. Attended also the funeral of Mrs. Thompson, a cholera patient, on the 25th of December. His daughter was there—a tall, thin, delicate girl, aged eleven years and a half. She was seized with symptoms the evening of the 25th, and died the next day. Wheatley suffered from a slight attack, but recovered.

James Turnbull, a strong, healthy cartman, resided with his wife, a healthy woman, and ten children, in a house in Union-lane. They occupied only one apartment in the house: it was dry and airy, but too small for such a numerous family. He had helped to sheet and coffin the corpse of a cholera patient, named Jones, on the 26th of December. He described Jones as having been a very stout man, in weight above twenty stone. His body, after death, was very dark-coloured, and it emitted a bad odour. The coffin was carried by men as far as Newcastle bridge, where Turnbull was ready with a cart to receive it. He then drove the cart to the Ballast hills, and sat during this time beside the coffin.

During the night of the 27th, Turnbull was seized with violent symptoms of cholera. He

died the 28th. After his attack, his wife suffered from purging and vomiting, and before many days had elapsed, all the children had diarrhœa to a greater or less extent.

Robert Brown, aged forty-five, a smith, resided in the house next door to Turnbull, with his wife and four children. They occupied one apartment, which was dry and warm, and situated up stairs. Mrs. Brown visited Turnbull several times when he was ill of cholera. Had no fear of the disease, and she touched both his body and bed-clothes, in lending her services to assist him. She was seized with cholera the 31st December. Her husband was soon afterwards attacked. Both recovered.

James Scott, aged fifty-six, a strong, healthy man, resided at the Bottle Bank, in a passage opposite to the lodgings of Hindmarch. His room was lofty, and it and the stairs were clean; but the passage was very filthy. Scott was employed in Messrs. Alhusen's corn-lofts, Newcastle quay, and his occupation led him to that part of the town where the cholera was raging. In the evenings he was often heard to name the different persons who were dying on the quay, of cholera, and such occurrences seemed to make him dull and depressed. Tuesday night, the 27th

of December, he was seized with severe symptoms. He refused to take medicine, and died on Saturday. Scott had not been seen visiting Hindmarch's house. His wife baked her bread there, but the oven was below the apartment in which Hindmarch died.

James Wishart, shoemaker, aged thirty-six, a strong, healthy man, resided, with his wife, aged forty-two, and eight children, in a small, damp room, three feet below the surface of a bank against which it was built. In one corner of the room, there was a well of indifferent water; and leading past the windows, was a passage, about twelve feet broad, with a dead wall about fourteen feet high. About nine o'clock, A. M., of Monday, December 26th, Wishart was seized with cholera. He was not aware of having been exposed to infection, unless in his own lane, Pipewellgate, where the disease prevailed, on the 25th, in several of the houses. Two of his children, Ellison, aged thirteen, and Mary, aged eight years, were attacked on the 29th. The afternoon of the same day, William, aged four and a half, was seized. They were all carried to the hospital. William died, the others recovered. The evening of the 29th, another son, Robert, was seized. He died that night in hos-

pital. Friday, the 30th, John, aged eleven, and James, aged six, were seized, and they were carried to hospital. John recovered, James died. Thomas, aged fifteen, and Mrs. Wishart, had mild symptoms during the 29th. They did not go to hospital, but recovered under medical treatment at home.

Mrs. Harriet Carrot resided with her family in Pipewellgate. Their circumstances were easy, and their house dry, airy, and comfortable. Mrs. Carrot was seized with cholera on Saturday, December 24th. A short time previous to her attack, she had been to see her mother, Catherine Bamboro, at the Keelman's hospital. Mrs. Bamboro had been attacked by cramps in the legs; and several persons had died about that period of cholera in the Keelman's hospital. Mrs. Carrot had no diarrhœa, or sickness of stomach, prior to the 24th of December. Had no fear of infection when she visited the hospital.

Mary M'Dougall, aged thirty-five, resided near Oakwellgate; and her mother, aged seventy-five, resided in the same house. Mrs. M'Dougall was sister-in-law to the above Mrs. Carrot, and she went down to Pipewellgate, Saturday, December 24th, to see Harriet Carrot, who was then lying ill of cholera. Her mother paid a similar visit on

Sunday. During Sunday evening, Mrs. M'Dougall went down a second time, and she returned home in company with her mother. Between nine and ten o'clock of that night, December the 25th, both were attacked by cholera. Mrs. M'Dougall died on the 26th, at three o'clock, P. M.; and her mother died at four o'clock, P. M.

Eleanor Eggleston, Oakwellgate, sister to Harriet Carrot, visited her mother, Catherine Bamboro, in the Keelman's hospital; and previous to the 24th of December, when her brother's family in Hillgate were attacked, she had diarrhœa. During the 25th she went repeatedly to see her brother's family, but did not remain long in the house. December 29th, she was seized with violent symptoms of cholera, and she died on the morning of the next day. Her husband had diarrhœa for a fortnight after her death. He attributed his complaint to the fatigues he had endured during his wife's illness: it was removed by medical treatment. Their four children escaped.

Jane Brown, aged fifty-five, resided in the ground floor in the house of Eggleston. Her health had been impaired for years. She was seized with cholera, Monday, 26th December, about four o'clock, A. M.; and she died the next

day, at ten o'clock, P. M. Brown did not go out much, and it is said she could not have been exposed to infection, unless in the house where she lived, and where people were lying ill of cholera. Her husband was greatly alarmed by her death. He experienced cramps in the feet, but no other symptom.

John Usher, aged fifty-five, a strong and healthy labourer, resided, with his wife, a strong, healthy woman, and two daughters, in a dry, airy, elevated situation, on the top of Pipewellgate Bank. Mrs. Usher visited M'Dougall's house, near Oakwellgate, and attended upon Mrs. M'Dougall and her mother, until they died, and on Monday, December 26th, she laid out their corpses. She then returned home. During Tuesday she complained of diarrhœa, and she was attacked by cholera on Wednesday. She died on Thursday morning. At twelve o'clock in the night of Thursday, her husband was seized. He died Friday, the 30th, at ten o'clock, A. M. After this, the two daughters had violent diarrhœa. It yielded, however, to treatment.

Joseph Aisbill, aged twenty-one, rope-maker, a strong, healthy lad, resided up-stairs, in Oakwellgate, in a large, dry, airy room. He went down to Pipewellgate, December 29th, to attend

the funeral of Mrs. Usher, but the funeral did not take place that evening, and he remained four hours in the room with the corpse. The next morning, at four o'clock, he was seized with cholera.

Hannah Days, aged sixty-five, a healthy woman for her years, resided in an up-stairs apartment of a dry house, in Oakwellgate. She visited M'Dougall's house on the 26th of December. Soon after, Mrs. M'Dougall and her mother died of cholera, and she assisted in laying their bodies out. During Thursday, the 29th, she was seized with severe diarrhœa, and on Friday, with cholera. She died the next day. Her son and his family, who had lived with her, immediately left the house, and did not return until the end of eight days. In the interval, however, one of the children, aged six months, had the diarrhœa; and another, aged twelve months, had diarrhœa and vomiting in a severe degree. The husband was affected with only slight symptoms.

Henry Bamboro, aged thirty-eight, a waterman, in easy circumstances, resided with his wife, Hannah, aged thirty-one, and five children, in Hillgate, opposite to the vinegar factory. The house was divided into different tenements, and Bamboro had his upon the ground floor,

which was spacious, dry, and airy. Mrs. Bamboro had been unwell, from cold, for a few days, and, on the morning of Saturday, the 24th of December, she went to the Castle Garth, in Newcastle, to purchase some clothes for her son George, who accompanied her. She was a relative of the families of Carrot and Eggleston, in Pipewellgate, but the intercourse between them was not frequent; Mrs. Bamboro complained, on Saturday night, of being unwell, and at four o'clock, A. M. of Sunday, December 25th, she was seized with violent symptoms of cholera. She died at two o'clock, P. M. of the same day. George, a fine healthy lad, who had been with his mother in Newcastle, was attacked on Monday. He died on Tuesday morning. Anne Bamboro, mother to the above Henry Bamboro, and noticed in the report of Carrot's case, as living in the Keelman's hospital, came over to attend her daughter-in-law. The surviving members of the family, however, immediately after the death of the boy George, removed to the Keelman's hospital, in Newcastle. Here, Anne Bamboro, the mother, aged seventy-one, was seized in the night of the 30th, with symptoms. She refused to take the medicine prescribed, and died January 1st. Henry Bamboro took ill on the

27th, the night of his removal to Newcastle: he recovered. Margaret, his daughter, was seized immediately after his attack commenced. She died the 2nd of January. Some time after this, the then remaining survivors returned to their old residence in Gateshead; but the cholera had not yet left them. Samuel, one of the sons, who had been affected with diarrhœa, was seized with severe cholera. He finally got better.

John Fox, a boy, aged twelve, whose mother died of cholera, in Newcastle, on the 24th of December, was over in Gateshead, amongst the children in Bamboro's house, and in Pringle's, almost the whole of that day.

Mrs. Stearment, aged forty-five, resided, with her family, in a dry, good room, above the Bamboros. She went down stairs, and attended upon Hannah Bamboro, during the Sunday of her illness, (December 25th,) and lent her both sheets and blankets. After her death, Mrs. Stearment brought the clothes up stairs to her own room, and washed them there. On December 29th, her father, James Daglish, aged seventy-five, was attacked by cholera. He died January 4th. One of the children became affected with the diarrhœa.

Mrs. Cooper resided, with her husband and children, in Hillgate. She kept a small grocery

shop, about one hundred and fifty yards from Bamboro's residence. When Mrs. Bamboro died, Mrs. Cooper went down to the house, and prepared a shroud, and put it upon the corpse. Her three daughters went also to the house. That same night, Eliza, aged four years, took ill of cholera at nine o'clock. She died the next morning at seven o'clock. Her husband and another daughter were seized with the diarrhœa, but it yielded to medical treatment.

Mrs. Daglish visited Cooper's house when Eliza was lying ill, and also when she was dead. For some days after, Mrs. D. suffered from a diarrhœa, and on the 2nd of January she was seized with cholera.

Mrs. Hughes resided, with her husband and three children, aged respectively eighteen, seventeen, and thirteen years, in an apartment in the third story of Bamboro's house. Anne, the eldest daughter, a healthy-looking girl, went once or twice into Bamboro's tenement, when Mrs. B. was ill, and also when she was lying dead. After this she became affected with diarrhœa, and on Tuesday, the 27th of December, at two o'clock, A.M. she was attacked by cholera. Mrs. Hughes was now also seized with vomiting and purging.

Elizabeth Hailes, or Thompson, aged fifty, re-

sided at Pipewellgate Bank. Her occupation was that of a labourer attending upon masons. Mrs. Hailes was the second individual attacked by cholera in Gateshead. The room in which she lived was up stairs, dry, and clean, and she possessed the necessaries of existence. Friday, December 23rd, she was seized with cholera. She died on the 24th. During the illness of Hailes, no inquiry ascertained whether or not she had been visiting cholera patients, and after her death no person could give the desired information.

Sunday, December 25th, before the corpse of Hailes was removed for burial, her niece, Eliza Brown, came from Stourbridge, where the brother of the deceased, Mathew Hailes, resided. Brown remained an hour or so, in the apartment containing the corpse. At two o'clock, A. M. of Monday, December 26th, after her return to Stourbridge, she was attacked by cholera, and she died at eleven o'clock, P. M. of the same day. Stourbridge is about half a mile from Pipewellgate, where Hailes had died of cholera; and the house is clean and warm, and well ventilated: it stands alone, and has windows which open to the north and south. Mathew Hailes, the owner of this house, had attended his sister's funeral in Gateshead, and had also been in the room with the corpse. Soon

after coming home, he was seized with diarrhœa and pain in the bowels; and his wife contracted a similar affection. They both recovered under medical treatment.

Mrs. Inglis, aged twenty-seven, the wife of a carpenter in easy circumstances, resided in a good new house, which stood alone, in a neighbourhood where there were few others near it. Her sister, Catherine Robson, was staying with her on a visit. Mrs. Inglis went to see Pattison and the family, when they were suffering from cholera. She was soon afterwards seized herself with symptoms, but recovered. During her illness, she was attended by Catherine Robson; Robson was also soon seized with cholera: she died in a few days.

William Dowling, aged forty-two, a stout healthy man, resided at Hillgate, with his wife and one child, in an up-stairs room. The house, being built against the hill, was damp and confined. His employment consisted chiefly in sweeping the streets, for which he was engaged by the Board of Health. His wife was not aware of his having visited any patients in cholera, or of his having whitewashed their houses. On Sunday, December 25th, he was attacked by severe symptoms of cholera, and he died the morning of the 27th. His son Richard, who had

been in the house during the period of his father's illness, was seized at seven o'clock, A. M. of the 27th: he recovered in about eight days. Mrs. Dowling attended upon him when ill, and she became subject to vomiting and purging: these symptoms were subdued.

Joshua Stearment, aged forty, (brother of the preceding Stearment,) resided, with his wife, in the house, and in an apartment on the same floor, with Dowling. His wife's parents, William and Anne Carlis, resided with them. Stearment had been drinking on Christmas-day, and he had visited Dowling, who was then ill of cholera, and assisted him to go in and out of bed. Stearment was seized with symptoms on the 26th, and he died on the 27th. His mother-in-law, Anne Carlis, was attacked in the night of the 26th; she died on the 28th. Was in Dowling's the day before her attack.

Mrs. Slater resided in a clean, airy, comfortable room, situated in the Close in Newcastle, where the cholera had not appeared at the time to which this refers. Early on Saturday morning, Mrs. Slater came over to Gateshead, to see her brother, the above-mentioned William Dowling, and she remained in his house until after his death. She washed and stretched the body, and while engaged

in doing so, she said she felt very unwell. She returned to her home in Newcastle, and was soon seized with cholera—forming the first case that occurred in her immediate neighbourhood.

George Parkins, with his wife and an infant, resided in the Close in Newcastle. He was employed with Dowling, under the Board of Health in Gateshead. Mrs. Parkins was sister to Dowling, and she came to attend his funeral. She sat in the room with the corpse, before it was coffined, six or seven hours. Previous to her leaving the house, she was attacked by cholera. A sedan chair was sent for, in order to have her conveyed home; but neither a chair nor a coach could be procured, as it was intended for the use of a cholera patient: she was therefore carried home by two men. The case terminated favourably in a fortnight.

Margaret Hadden resided, with her husband and nine children, aged from seventeen to four years, in a large, comfortable room, on the low side of Hillgate. Anne Hadden, aged twelve years, was attacked, January 1st, with cholera, and she died on the 4th. She had been much employed in Joshua Stearment's house, both before and after he died of cholera. The Stearments were in the habit of sending for her, to her mother's house,

where she lived. After her death, all the members of her family had attacks of diarrhœa, but none else advanced so far as the stage of collapse. The different individuals of this family were, previous to these affections, in good health, and their house was on the more healthy side of the street.

Mary Richardson, aged forty-four, washer-woman, resided at Hillgate, with her father, Joseph Richardson, in a room up stairs: the room was dry and airy. When Cooper's child died of cholera, on Monday, December 26th, its clothes, &c. were immediately sent to Mary Richardson, to be washed. Her father was present when they were brought in: he was much displeased with the daughter for receiving them, and he left the house in a passion. The clothes were washed that day, and Mary Richardson, who performed the washing, was seized at night with cholera. On the 31st, her father was attacked also.

William Holder, smith, aged thirty-five, resided, with his wife and one child, in a clean warm room, in Hillgate. At six o'clock, A. M. of the 25th December, Mrs. Holder was called up to visit Mrs. Bamboro, of the same street, who was labouring under cholera. She went accordingly,

and remained with her until she died. Mrs. Holder felt unwell during the 27th, and on the 28th she was seized with diarrhœa. The cholera set in severe the 29th, and she did not regain her health for ten days.

William Corbey, aged fifty-eight—Hillgate. Was at the funeral of Mrs. Vinton, who died of cholera, in Oakwellgate, the 25th of December. Did not enter the apartment in which the corpse had been lying; but when brought out coffined, he thought that it emitted a bad smell. Felt unwell through the succeeding week, but attempted to keep to his work until the symptoms obliged him to give it up. Had violent diarrhœa at first, and vomiting began afterwards. He recovered eventually, having experienced a tedious attack. Anne Corbey, his daughter, was seized the 8th of January. She lived in the same house, and she had attended her sister, Mrs. Holder, while ill of cholera. She had also attended one Kay, during the existence of the worst symptoms. Kay often laid his hands upon her arms, and the disease made them appear at the time as if they had been boiled.

Robert Pringle, boatman, aged fifty-two, a strong healthy man, resided, with his wife and four children, in a low damp room, situated in a

yard near the river. The room was large, and generally contained a good fire. During the 25th of December, Pringle and his wife visited Mrs. Bamboro, the cholera patient, and they remained in her room about ten minutes. On Tuesday, the 27th, Mrs. Pringle was seized with severe symptoms. The 29th, her son James was attacked, after having had the premonitory diarrhœa. The 30th, another son, named Walter, was seized. On the 31st, her daughter Mary was seized. The father escaped the disease for nearly a fortnight subsequent to this period. He was then seized, and although he recovered, he had a very narrow escape from death. Two or three families that lived in the same yard as the Pringles, escaped the disease altogether.

Mrs. Wallis, sister to the above Mrs. Pringle, attended upon her during her illness. After having been engaged in applying hot salt to Mrs. Pringle, "she was seized in a moment, all over her body, with a singular feeling, such as she had never felt before." She went home to her own house, which was situated about the middle of Hillgate, and was soon attacked with symptoms of cholera. She died in the consecutive fever. After her seizure, her son William was attacked. Mrs. Wallis was not in the least afraid of infection.

She always said, that somebody should wait upon the sick.

Margaret Carson, aged eight, resided with her parents, in Hillgate, in a clean, dry house. The family to which she belonged, were in good worldly circumstances. Margaret Carson, contrary to her mother's orders, went up to see the funeral of Mrs. Bamboro:—she entered the room where the coffin was, and she remained for a considerable time close to it. Many full-grown persons and children were there also. She was soon after this exposure seized with cholera, and formed a very bad case. Recovery, however, took place, in opposition to the opinions of the medical attendants. Mrs. Carson and the other children left the house during the illness of Margaret, and remained at some distance from it.

Margaret Taylor, aged fifty, twine-maker, resided in Oakwellgate, Gateshead, but worked in a factory in Newcastle. Some of the boys in the factory came from Stockbridge, where the cholera prevailed: none of their relatives, however, were known to have had the disease at this period, although a few of them died of it afterwards in Newcastle. Taylor, in going to and returning from her work, passed along the Close in Newcastle; and on Saturday, December 24th, in

coming home at noon, she stopped and conversed with a woman who was crying in her door-way about her sister, who had died of cholera in the house. Taylor was seized with symptoms at four o'clock, A. M. of the 25th, and she died on the evening of the same day, in her place of residence, in Gateshead.

Mary James, aged thirty-three, resided, with her husband and family, in a passage off the High-street, a quarter of a mile from Oakwellgate. She attended Margaret Taylor, without fear, when she was ill, on Sunday, December 25th; and in the evening, after her death, she "streeked her." Mrs. James, while returning home, called upon a man of the name of Innes, in order to tell him what she had seen and done; and she remained twenty minutes in his apartment. Innes was sixty-six years old, had some symptoms of dropsy and gravel, and seldom left his home. During this day, his general health was as good as could be expected; he dined heartily, and after talking with Mrs. James, he went to bed. About seven o'clock, A. M. of Monday, Innes was seized with severe symptoms of cholera. He refused all medical aid; he died at six o'clock, P. M. Some of this family had incipient symptoms after his death, but they recovered.

Mary James, after leaving Innes, went to her place of residence. On Monday, the 26th, she visited Oakwellgate, and coffined Margaret Taylor. She came back in a short time. No evidence of the disease appeared in her family until Thursday, the 29th of December: then her daughter, Eleanor, aged fifteen months, exhibited symptoms, and she died of them at ten o'clock, P. M. of January 3rd. Another child, George, aged seven years, went to bed, the night of his sister's death, in good health, but the next morning he had an attack which proved fatal. The mother, Mary James, suffered that week from severe diarrhœa and sickness of stomach; her husband had diarrhœa also: both recovered.

Mrs. Gascoigne, aged thirty, a healthy woman, resided in a dry, clean, airy house, in Oakwellgate. Mrs. Gascoigne went into Taylor's house the 25th of December, when the friends were laying out the corpse of Mrs. Taylor. She had a child in her arms, a boy named William, aged two years; and she remained only a short time. The morning after visiting Taylor's, Mrs. Gascoigne was seized with diarrhœa, but she recovered under medical treatment. The little boy was attacked with cholera January 1st. He died on the 5th.

Charles Walls, aged thirty, a labourer, of irregular habits. He resided, with his wife and two children, in a damp room in Union-street. While out of his usual employment, he was engaged by the Board of Health to whitewash the houses in which there had been cholera patients. For this purpose, he went into Robson's house, in Jackson-street, the 3rd of January, a few days after the members of that family had died of the disease. The house had been shut up from the 28th, the date of their last burial. Walls said, when he entered it, that he experienced a very bad smell. He had another man with him to assist in the whitewashing. In about ten minutes after he entered the house, Walls complained of being very unwell. He was conveyed home immediately, and violent symptoms of cholera soon became developed. He died on the 5th January. During this day, the man who had accompanied Walls was also seized: he died on the 8th.

Elizabeth Walls, sister-in-law of the above, came to wait upon Walls while ill of cholera, as his own wife was near her confinement. She took the disease on the 8th of January, and died during the 10th.

The sketch just given of the spreading of cholera in Gateshead, will afford some ground for believing, that all the early cases occurred in persons who had been, a short time before, either visiting cholera patients, or exposed to a medium through which, had it existed, contagion might have been transmitted to them. The cases recorded here, have not been selected as peculiarly favourable to this opinion; they were taken in preference to others—which I must at present withhold for want of convenient space—simply on account of the early periods of their occurrence, and their chiefly extending in particular families. Moreover, to render the evidence to be derived from them as impartial as was possible, every defect in the chain has been carefully described, and every fact that came to my knowledge, seeming to operate against the hypothesis of contagion, has been faithfully inserted. Having pursued this course, and making allowance for the numerous difficulties* to be encountered in prosecuting such

* One, and not the least, of the difficulties which are experienced in attempting to trace the propagation of cholera to the intercourse of the healthy with the diseased, is an effect of the rapidity of its attack. The individual who could furnish the best information on this head—namely, the

investigations, it appears to me, that they have been very successful in tracing the propagation of the disease to a power of communicability; or at least, in demonstrating that its mode of propagation in Gateshead, where its progress was rapid, differed in nothing from that in other places where its progress was slow, unless in the circumstances which affected the intercourse and predisposition of the inhabitants. The latter modified view, the justness of which is unquestionable, proves the existence of an uniform cause for its diffusion, and therefore permits us to revert to the whole history of cholera, in every climate and country where it has been, for evidence to explain the nature of that cause.

The rapid manner in which cholera has spread, when its progress is compared to that of other contagious diseases, is, with many, a barrier to the admission of its being contagious at all; but

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patient himself, is generally carried off by death before an inquiry is made into the manner of its origin; and even where it does not so happen, the patient and his friends are often extremely solicitous to conceal the facts, lest they should support the doctrine of contagion, and render themselves objects of terror to their neighbours and the public at large.

we have in its ascertained laws, the means of removing this. The duration of latent infection is much shorter in cholera, than in the others—indeed, it is usually comprised in one or two days; and, therefore, he who visits a patient ill of cholera to-day, may, if susceptible, have the symptoms in his own person to-morrow, or next day. On this principle, we can easily perceive how cholera is soon disseminated through a locality, after the arrival of one individual; and where many infected persons arrive, in or about the same time, that it may spread among the predisposed with the rapidity nearly of a malarious epidemic. Towns, situated in the vicinity of a diseased neighbourhood, frequently have the cholera extending from a number of foci, owing to the simultaneous arrival of several infected individuals. This plurality of origin has been advanced in defence of anti-contagionist opinions; but nothing could appear more untenable, wherever I have had an opportunity of examining into its merits: let us take, for example, the introduction of cholera into the neighbourhood and village of Dunstan, near Newcastle-upon-Tyne.

The first case occurred in a man named Samuel Haey, who resided at Lobley-Hill, about one mile from Dunstan. After having been from

home three days, he returned on the 20th of December, 1831, complained of the symptoms of cholera, and died of the disease on the 25th, without informing any of the people who saw him when dying, of the place where he had been while absent.

The second case was that of Joseph Daglish, a sailor, who lived at the eastern extremity of Dunstan. He had spent the night of the 21st of December in Newcastle, where the cholera was prevailing at the time, and he was taken ill after his return on the 25th, and died.

The third case was that of Peter Legg, a keelman. He lived at the western extremity of Dunstan. On the 24th of December he visited Sandgate, in Newcastle, and entered a house from which a cholera corpse had just been removed. He took the disease on the 25th, and died next day.

The fourth case was that of John Bates, a mason. He had spent the night of the 24th of December in a close in Pipewellgate, a lane of Gateshead. During the 26th he was attacked by cholera, and died in twenty hours.

The fifth case was that of Jane Bertram, who lived at Lobley-hill. On the 25th of December, she visited the house where the subject of the first

case died. She was seized with cholera on the 27th, and died in two days.

The sixth case was in John Forsyth, a keelman, who resided in Dunstan. He had been in Newcastle on the 21st of December, in company with the subject of the second case. (His wife said he passed the night in Sandgate, where he had been accustomed to take a temporary lodging.) He was seized with cholera on the 28th, and he died next day.

The disease soon spread into every house in Dunstan, which was situated in the vicinity of those of Legg and Daglish, who lived at a distance of about three-quarters of a mile from each other; but it did not reach the centre of the village until seven days after the deaths of both these patients.

In the parish of Whickham, the cholera made its first appearance on the 8th of January, in the person of a little girl, aged nine years. She had been visiting, a few days before, her relatives in Dunstan, who had a child labouring under the distemper.

The nurse who attended the third and sixth cases, contracted cholera soon after this exposure, and died of the disease. The only two females that attended the fourth case, took the disease: one died, the other recovered.

The rapid progress of the cholera in Dunstan and its neighbourhood, is satisfactorily accounted for, in the number of the persons by whom the disease was simultaneously introduced; and the history of the cases in Gateshead, together with the circumstances under which the cholera commenced, may furnish a reason for its comparatively rapid progress in the latter. The position of Gateshead, in relation to the approaching inroad, was very unlike that of Newcastle and Sunderland, at the time of their invasion. Before the cholera began to spread in Gateshead, it had been established in Newcastle nearly three weeks, and more than two hundred people had been attacked there. As these two localities may be considered one and the same town, being separated merely by the river, the reader will perceive that the inhabitants of Gateshead had an extensive focus of the malady almost at their own doors; and that they would be extensively infected, the moment their intercourse with this focus became enlarged, and their persons susceptible of the morbid change. These contingencies were accordingly realised about the 23rd of December, when the Christmas festivities commenced, and threw the inhabitants into a prolonged paroxysm of dissipation. Within the three days, including

Christmas-day—as I have been informed by gentlemen who reside in the neighbourhood, and who were unacquainted with my object in putting the question—two-thirds and upwards of the adult population of Gateshead were intoxicated, or had drunk largely of spirituous liquors; and a large proportion had been visiting their friends and acquaintances among the diseased and dissolute of the lowest classes in Newcastle. Need we, then, be surprised that of the inhabitants of Gateshead, amounting to 15,000, there should be forty or fifty individuals seized with cholera during Christmas-day, and the day that succeeded? As soon as they were frightened into sobriety and caution, the number of the attacks rapidly diminished.

Comparative Number of Burials.

Few subjects have been overlaid with more erroneous assertions than cholera; and to the interests and the influence of trade, the majority of these must be attributed. One of the assertions which were got up to diminish the public apprehension regarding the disease, and in this way to attack indirectly the restrictions of quarantine, was, that "in no place invaded by cholera had

the bills of mortality been increased beyond their ordinary rate." The subjoined statement, however, tells a different story.

The number of burials in the parish of Sunderland, from the 26th of October to the 14th of December, both days included, was—

	Burials from the Common Diseases.	Burials from Cholera.
In 1829	48	0
1830	81	0
1831	84	119

In the year 1831, then, the burials of persons who had died of the common diseases in Sunderland, exceeded those of any preceding year; and, to obtain the aggregate mortality, we must add to these, the numerous burials of cholera cases, which will more than double the ordinary amount.

Within six parishes of Newcastle—Ballast-hills, All-Saints, St. Nicholas, St. John's, Westgate, and St. Anne's—the number of the burials for the months of November, December, January, and February, during three successive years, will stand thus:—

	Burials from the Common Diseases.	Burials from Cholera.
1829.—November, December, January, February,	357	0

	Burials from the Common Diseases.	Burials from Cholera.
1830.—November, December, January, February,	448	0
1831.—November, December, January, February,	527	306

In Gateshead, for the same months and years

1829.—November, December, January, February,	85	0
1830.—November, December, January, February,	115	0
1831.—November, December, January, February,	111	104

In Newcastle and Gateshead, the addition of the cholera burials to those of the common diseases in 1831-32, will shew them to be nearly equal to twice the ordinary rate of burials in preceding years; yet, high as is this increase, it does not exhibit the whole amount of the relative mortality. For example, the cholera burials in Gateshead

were 104; whereas, the sum of the deaths of cholera patients in the parish and its dependencies, was 146—and so of the other localities. The apparent excess of the deaths over the burials is owing to the partiality which many people have for burying their friends in parishes distant from their places of residence. The friends of persons who died of cholera had, in distant interment, a particular object to serve—they sought to conceal the nature of their disease, and in this way to save their remains from being consigned to the common trench prepared for such.

Comparative Mortality among the Cholera Cases alone, at different Periods of the Local Inroad.

An opinion obtains, that the cases of cholera have a more fatal tendency at the beginning of the inroad in a town, than at any after-period of its prevalence. "Appearing," it is said, "under the most deadly type, the disease at first kills nearly all whom it attacks, and then it becomes gradually less severe." The justness of this statement, although founded upon what has been called "a general law of epidemics," is very questionable when applied to the progress of cholera in England. The comparative mortality

may occasionally be greater at the onset than afterwards; but several circumstances, apart from any change in the character and virulence of the symptoms, conspire to produce such a result:—1st. When cholera has just entered a town, the patients are not so much alive to the necessity of seeking early medical advice, as after they have had experience of the baneful effects of delay. 2nd. The practitioners, having been made practically familiar with its stages and symptoms, are better qualified to treat the disease, in the later periods of the inroad, than in the earlier. 3rd. The practitioners can bestow a greater share of their attention on the patients in the later periods, when the cases are few, than in the earlier, when the cases are numerous.*

An opinion that gains almost universal credit, although unsound, is usually based upon a specious foundation; and that which advocates the gradual diminution in the virulence of the cholera cases as the inroad advances, seems to

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* A considerable space is here occupied to remove the impression that exists, of the cholera cases being more violent in the earlier period of an inroad than afterwards; for, should medical practitioners believe that the early cases must of necessity prove fatal, their exertions to preserve them will be relaxed.

have originated in the Medical Reports. The mode in which the cases are published in the Reports, as "deaths" and "recoveries," conveys an impression to the minds of many, that the mortality is much higher than is the true proportion, during the onset of the local invasion; and that it is much lower than is the true proportion, during its decline. In the patients "remaining on the sick list," will be found the particular cause of this mistake, and also the means of correcting it. At first, the number of the "deaths" considerably exceeds the number of the "recoveries." But recovery, it should be observed, is a slow process, and the majority of the "remaining" cases take several days before they can be returned under this head. Their return, consequently, after the lapse of several days, in the shape of cures, will reduce the comparative mortality, for the time, far below what it would be were these cases carried back to their proper place in the commencement of the inroad.

By reverting to the returns of the cases, as furnished in the "local progress of cholera," and by resorting to a juster method of computation,* we

* In the mode of computation adopted here, the "cases remaining on the sick list," in the commencement of the inroad,

shall soon perceive that the comparative mortality was nearly the same in the decline, and in the commencement of the inroad, at Sunderland, at Newcastle, and at Gateshead.

At Sunderland, during the *first* twenty-one days, ending with November 23 :—

Cases, 134 ;—Recoveries, 73 ; Deaths, 61 ;—

Comparative mortality, rather less than one-half of those attacked.

At Sunderland, during the *last* twenty-one days, beginning with December 14 :—

Cases, 94 ;—Recoveries, 49 ; Deaths, 45 :—

Comparative mortality, rather less than one-half of those attacked, but somewhat higher than in the commencement of the local inroad.

At Newcastle, during the *first* twenty-one days, ending with December 29 :—

Cases, 309 ;—Recoveries, 201 ; Deaths, 108 ;—

Comparative mortality, rather more than one-third of those attacked.

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are added to the " recoveries ;" and this seems to be a fair way of approximating to a knowledge of the true comparative mortality, as in giving the numbers in the termination of the inroad, the patients " remaining " are included in the aggregate of the " cases."

At Newcastle, during the *last* twenty-one days, beginning with February 20 :—

Cases, 26;—Recoveries, 18 ; Deaths, 8 ;—

Comparative mortality, rather less than one-third of those attacked.

At Gateshead, during the *first* seven days,* ending with December 31 :—

Cases, 223 ;—Recoveries, 157 ; Deaths, 76;—

Comparative mortality, rather more than one-third of those attacked.

At Gateshead, during the *last* seven days, beginning with January 30 :—

Cases, 13 ;—Recoveries, 10 ; Deaths, 3 ;—

Comparative mortality, rather less than one-fourth of those attacked.

In this exposition of the mortality at different periods of the local inroad, there is proof that the disease did not in these instances diminish in virulence, or assume, towards its cessation, a mild character. At the terminating period of the in-

* Seven days are here taken, in preference to twenty-one, on account of the short duration of the local inroad at Gateshead, which was comprised, altogether, in the period of forty-two days.

road in Sunderland, the mortality was above one-half of those attacked, and higher than what it was at the beginning. In Newcastle, the mortality in the first and last periods was nearly the same. And in Gateshead, where, of late, more cases comparatively recovered than in either of the preceding towns, the difference of the mortality in the commencement and termination of the inroad, was only as three to four. Moreover, if we add all the cases together, and all the deaths together, and then institute a more comprehensive comparison between them, we shall perceive that the comparative mortality, when taken collectively for the three localities, is very nearly of similar amount at the commencement and termination of the inroad.

Summary of the Cases and Deaths which are comprehended in the preceding Estimate.

Commencement of the Inroad:—

	Cases.	Deaths.
Sunderland.....	134	61
Newcastle	309	108
Gateshead	233	76
Cases	676	Deaths 245

Termination of the Inroad:—

	Cases.		Deaths.
Sunderland.....	94	.....	45
Newcastle	26	.....	8
Gateshead	13	.....	3
Cases..	133	Deaths..	56

Here the calculation is made on a pretty large scale, and a fatal uniformity is apparent in the character of the cholera cases; but it must also be admitted, that, in a narrow view of its progress, cases may at times be noted, in which the symptoms are comparatively mild—modifications probably induced by the subjects of them having been long resident in a diseased neighbourhood, and therefore seasoned to the influence of the cholera miasm, or from their having been constitutionally little susceptible of its impressions. These cases, however, do not seem to be sufficiently numerous or regular in their appearance and numerical increase, to overturn or shake the general position which has been laid down. The mistakes current on this subject can scarcely be accounted for, unless by supposing that patients affected with premonitory symptoms alone, have been occasionally entered in the returns as well-marked attacks of cholera; for about the period of

decline, the premonitory cases are exceedingly abundant—in a far greater degree than at an earlier date—and so tractable, that many of them will recover without medical aid.

Difference of Predisposition in Age and Sex.

In India, children were the least liable to the attacks of cholera; and of adult females and males, the former seemed less susceptible than the latter. In England, also, children are the least susceptible; but it is difficult to decide between the respective tendencies of adult males and females. In Sunderland, Newcastle, and Gateshead, the number of females attacked exceeded that of males by a fourth and upwards. It does not, however, necessarily follow, that adult females are, in this country, more susceptible than the males. Instead of ascribing the circumstance to a stronger predisposition on the part of the females, I would unite rather with a recent writer,* in ascribing it to the more frequent intercourse which the females maintained with the sick; and to the larger proportion which, in some instances, they bore to the male division of the adult population.

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* Mr. Ainsworth, author of "Observations on the Pestilential Cholera." London, 1832.

SECTION V.

Modifications in the Symptoms and Treatment of Cholera.—General view of the disease as it has appeared in England.—Irregularities in the Symptoms.—Diagnosis.—Treatment of Cholera in England: Preliminary Measures; Premonitory Symptoms; Acute Cholera; Chronic Cholera.—Cases.—Concluding Observations.

Modifications in the Symptoms of Cholera.

As the symptoms of cholera are somewhat modified in this country, I shall attempt to describe, in a general way, their modifications, and also the modifications which the treatment necessarily assumes, before entering upon an enlarged consideration of the disease and of the remedial measures.

The symptoms are commonly much slower in their progress to death or to recovery in England than in India. In England, the disease is commonly attended with premonitory symptoms of many hours', or perhaps of some days' duration, previous to the commencement of the severe

attack, affording a most favourable interval for the adoption of medical treatment; and even when the severe symptoms have set in, it is but seldom they advance with such rapidity as was their usual course in India. In England, the cramps are less severe in the extremities, and the spasmodic action of the stomach and bowels, evinced in vomiting and purging, is commonly less violent. The cold and clammy perspirations are less profuse. The patient loses his animal powers less rapidly, and the blue, or *poisoning*, appearance, as it may be called, is slower in establishing itself. In India, the disease was seldom attended with a severe consecutive fever, and when it was, the fever assumed the types indigenous in that country. In England, acute cholera is almost uniformly productive of a severe fever, and this fever assumes the different types indigenous here, appearing, according to circumstances, in the form of typhus, or of simple inflammatory fever, or of the synochal.

In this outline are enumerated the more prominent modifications which the symptoms of cholera have presented in England; but, it must not be forgotten, many cases occur which preserve throughout the whole of the acute period an exact resemblance to the cholera in India, and without

undergoing the slightest modification in any of the phenomena that precede the consecutive fever.

Modifications in the Treatment of Cholera.

In the third section of this treatise, where the treatment suited to the cholera in India is described, the disease is divided, for practical purposes, into two types, and the acute period of each of these types is divided into two stages. In neither type, as far as I had an opportunity of testing its worth, did the copious use of spirituous stimulants prove serviceable. In the first stage of the protracted type, the effect of such stimulants was obviously deleterious, and in its second stage, and in both stages of the rapid type, their administration required to be graduated with great caution, and confined to a moderate quantity.

In the management of the cholera in England, the use of brandy and other spirituous stimulants ought to be still farther restricted, and the use of laudanum ought also to be confined within narrow bounds. Here, the tendency to the formation of a violent consecutive fever is so strong, that the free exhibition of stimulants during the acute attack, may be the efficient cause of the patient's death in the chronic, should he survive to reach it. I have never witnessed any permanently beneficial

effect, as a consequence of the free exhibition of spirituous stimulants in acute cholera, and rarely would I prescribe them, even in small doses, during that period.

The type of cholera, which in India was accompanied with severe spasms, was treated advantageously with large doses of calomel and opium, and with the warm bath; but in England the spasms are less severe, and I have rarely thought it necessary to prescribe these medicines, unless in very small doses. The application of dry heat has been successfully substituted for the moist bath.

Blood-letting still maintains the high reputation which, as the most powerful auxiliary remedy, the majority of practical writers assigned to it in India; but in England, the quantity of blood to be taken from an adult patient, to produce a proper effect, need scarcely ever exceed twenty ounces, and in general fourteen or sixteen ounces will be amply sufficient. In an occasional case, however, it may be absolutely necessary to repeat the blood-letting.

I shall now give a general view of the morbid phenomena which have been developed in the progress of cholera in England; and, for this purpose the disease may be divided into three

periods—1*st*. The Premonitory Symptoms; 2*nd*. Acute Cholera; 3*rd*. Chronic Cholera.

PREMONITORY SYMPTOMS.

The symptoms, which in England precede the attack of cholera, and give warning of its approach, are,—diarrhœa, nausea, dark circle around the eyes, twisting pains in stomach and bowels, and expulsion of wind, feeling of anxiety and vomiting, flatulent commotion in stomach and bowels, general uneasiness, giddiness, ringing in the ears, headache, dimness of sight, impaired hearing, cramps in the extremities, feeling of numbness, coldness, and pricking in extremities, loss of power in extremities, twitching or fluttering sensations in the muscles of extremities, shooting pains in arms and legs, and in hollows of feet, &c.

In the above summary are all the symptoms of any importance that I have observed to precede the formation of cholera in a vast number of cases. It rarely happens, however, that all of these will be experienced in a single case; one symptom alone, or a few—as twisting pains in stomach and bowels of themselves, or followed by diarrhœa, or those with giddiness and numbness, are the common precursors of the severe attack.

A line of demarcation to mark the period when the premonitory symptoms run into those of acute cholera, would be useful; and in trying to draw this line, I have always considered the cholera as fairly formed, when constitutional disturbance is added to the premonitory indications; or when any two of the severe symptoms, as frequent vomiting and purging, or either of these morbid actions, with severe cramps, are established.

ACUTE CHOLERA.

When the premonitory symptoms have become severe, or are accompanied with considerable constitutional disturbance, showing that the disease is fairly commenced, I have given to this period of it, the name of acute cholera—and the name continues to apply until the symptoms of the consecutive fever appear. Acute cholera is here divided into *two stages*, and it is of importance in practice to attend to this arrangement.

First Stage of Acute Cholera.

The patient is affected with vomiting and purging of a fluid like rice water, or gruel. Has twisting pains in stomach and bowels, or in both. Has occasional cramps in extremities, and more

particularly in the hands and feet, and calves of legs. Complains of general oppression. The pulse is as yet distinct; the surface of the body is as yet warm, and in some persons it may be even hot and febrile. The tongue is moist and pale, without fur. There is thirst and suppression of urine.

The preceding symptoms, marking the onset of acute cholera, continue to increase in severity, and after a longer or shorter period, the pulse begins to diminish in strength and in volume, and the heat of skin begins to decline. In the further progress of this, the first stage, the strength of the patient is exhausted. His features, deepened and sharpened, present a ghastly expression. Skin cold and moist. Pulse scarcely perceptible at the wrist. Voice husky and weak. The increasing collapse evinces the near approach of the second stage.

Second Stage of Acute Cholera.

The patient is now in a state of real debility. There is either no pulse in the superficial vessels, or it is reduced to a thread, and the action of the heart is extremely feeble. If a vein be opened, and any blood be procured, it is thick and black, like currant jelly, and nearly destitute of serum.

The cramps, which had been severe, are now scarcely felt. Features cadaverous, skin deadly cold and moist, and in many cases blue and corrugated about the hands and feet. Voice cannot be raised above a faint whisper. Mental faculties, however, are perfectly clear and collected. Should the patient survive this dangerous condition, and reaction come round, he will pass into the consecutive fever, called chronic cholera.

CHRONIC CHOLERA.

With the appearance of reaction at the end of the second stage of acute cholera, the symptoms of the consecutive fever commence. The skin of the patient, which had been for a time deadly cold, gradually acquires heat. The circulation, which had ceased in the superficial vessels, is gradually restored. The secretion of urine, which had been suppressed, returns. The tongue, which had been moist and pale, becomes dry, and covered with a white or brown fur. In short, the patient soon comes to suffer from the symptoms common to a continued fever; and this fever, in cases where the severity of the earlier stages of the disease had not been subdued by medical treatment, will be of the typhoid type.

Irregularities in the Symptoms of Cholera.

The above description of the symptoms will apply to the most ordinary course of cholera; but a deviation from this course is not unfrequent, consisting either in the absence of some one or more of these symptoms, or of a variable degree in their intensity. These irregularities in the phenomena have been the cause of much apparently contradictory testimony and strong feeling among medical men, which might have been avoided by an appeal to general experience—for, in no disease, do we find *all* the symptoms known to have attended it, present in every case, or of uniform intensity. Severe cramps in the limbs are commonly experienced in an attack of cholera, yet many cases occur in which the cramps are slight, or altogether absent. This exemption has been more particularly remarked in the attacks of young children. Complete suppression of urine is a common symptom; yet many cases occur in which the suppression is only partial, and in some the urine is voided in its natural quantity. After being suppressed, the secretion of urine is usually restored early in the consecutive fever; yet occasionally it remains absent during the whole of the febrile period. In an exceedingly rare case,

there has been no purging, and less rarely the absence of vomiting has been remarked. I have not seen both of these symptoms wanting in England, but in hot countries, where the disease has proved almost instantaneously fatal, such cases are recorded. The blueness and macerated appearance of the skin of the hands and feet are frequently not present. Instead of the shrinking of the features, a puffiness of face has been noticed in children, and in elderly persons of lax fibre and loose adipose structure. Some patients, while in the acute period of the disease, breathe with difficulty, and suffer from jactitation; others again die in the calmest manner, without either of these symptoms. In some the voice remains clear and pretty firm to the last. In three cases I have seen blood expelled from the bowels in considerable quantities;* and in two cases I have seen hemorrhage from the nose.

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* Aware of the irregularities in the symptoms of cholera, we can perceive the defective nature of the medical evidence delivered in London and elsewhere upon the disputed cases that preceded the local inroads. The case of Potts, who died at Shadwell, London, was brought before the Coroner and a jury, and it was declared to be *not* a case of cholera, in the opinion of Mr. Kay, a naval surgeon, and Mr. Malin, a Deputy Inspector-General of Hospitals. The Central Board

The abnormal symptoms do not seem, in the order of their occurrence, to have any connection with each other. The secretion of urine may be present equally in a blue case as in one where this change does not take place—and so of the remaining symptoms.

The question is asked daily,—"How are we to distinguish the pestilential cholera from the bilious cholera of this country?" but before attempting to offer a reply, the characters of the cases to be distinguished should be ascertained. If pestilential cases be permitted to run their natural course, and present in their progress the ordinary strong features of the disease, no qualified observer can hesitate for a moment in coming to a proper decision. A group of symptoms then afford concurrent evidence of the particular disease to which they belong. For instance, the rice-water, or the gruelly aspect of the fluid discharged—the changes in the constitution of the blood, and

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of Health sent these gentlemen for the purpose of giving evidence; and the facts on which they founded this opinion, were, the absence of spasms in the limbs, of purging, and of blueness of the skin, the presence of urine during the attack, and the vomiting of blood. Messrs. Kay and Malin were doubtless betrayed into their partial views of the disease by trusting too much to their individual experience.

early decline of the circulation and of animal heat—the blueness and corrugation of the skin on the hands and feet—and the appearance which the patient presents of a person labouring under the effects of some violent narcotic poison. The early decline of the circulation, indeed, the changes in the constitution of the blood, and the poisoning appearance, are the symptoms on which I would chiefly depend in forming a distinction. Under the last the patient seems to have some internal cause of oppression, which threatens to strangle the vital powers, and while life is withering within its death-grasp, the pulse rapidly disappears from the wrist, and the features of the patient are hollowed and sharpened into the expression of old age, when sinking in a torturing malady.

Some of the symptoms of the bilious cholera are similar to those of the pestilential; and, consequently, the cases of the latter which are not strongly marked, may afford ground for controversy in forming a distinction. Collateral circumstances are often of service in elucidating the truth, and they should be attended to. If the disease have appeared extensively in the winter of this country, a period of the year when the bilious cholera is scarcely ever known to prevail as an effect of climate; or if the subjects of it have had

intercourse, shortly previous to their having been attacked, with patients in the well-marked forms of the pestilential cholera, little or no doubt can be entertained regarding which side the facts and probabilities favour.

Looking at the "doubtful" cases, it has been asserted, that the pestilential and bilious cholera are the same disease. Were the resemblance in the symptoms, however, at times complete, such instances would not be sufficient to prove their identity; for diseases essentially different, may have external symptoms in every respect alike.

TREATMENT OF CHOLERA IN ENGLAND.

Having pointed out the modifications which have appeared in the symptoms of the cholera in England, and some peculiarities in its medical management, and having given an outline of the common features and progress of the disease, I shall enter on the more serious portion of my task, and submit in detail, a description of the symptoms in connection with the remedies, and a description of the preliminary measures to be adopted by the profession, in order that the powers of these remedies may have a fair trial.

While engaged in the pursuit of these objects, I am happy to say, the questions that have recently agitated and divided the medical world—of, whether the pestilential cholera be a new or an old disease? and, whether it be of foreign or domestic origin?—should be dismissed from the memory, and the sole consideration for the inquiring and impartial observer is to know that a very rapid and virulent distemper, called "cholera" is prevailing around us, and to endeavour to ascertain the best method of treatment, which the science of medicine has as yet afforded, to controul its progress and to remove its effects.

The enormous comparative mortality which has almost uniformly attended the pestilential cholera, in every part of Europe where it has prevailed, leads to the popular belief that the disease is little, if at all, amenable to medical treatment. Most commonly the mortality has amounted to one-third or one-half of those attacked, and in many instances, two-thirds have fallen victims. These unfortunate results will certainly either support the popular conviction; or they will favour a suspicion, that the treatment resorted to in the various places invaded, has been nearly equally defective, at least, leaving the labours of a few individual practitioners who have been pretty

successful, out of the estimate, and viewing the results on an extended scale. That the want of success did not depend upon any intractable quality of the disease, I shall soon endeavour to show, and I am inclined to ascribe the great mortality which has attended its course, to the inefficiency of the preliminary measures, and to the treatment suited to the different symptoms and stages of cholera not being distinguished and followed by the mass of practitioners. Had the practice been otherwise, plans of treatment the most opposed in principle could not have been daily advanced and recommended, since the first entrance of the disease into Europe until the present time. Cold and hot applications—the affusion of cold water, and the hot air bath—stimulants and sedatives, purgatives and astringents, stand contrasted, and each plan has the undivided confidence of its supporters. Unlike, however, the deductions of scientific medicine, they have respectively failed to perpetuate their supposed beneficial effects, when beyond the practice of their discoverers or first advocates.

The above discrepancies of opinion may be accounted for in the difficulty which is found in determining whether a patient has recovered through the efforts of nature alone, or through

the sanative powers of the medicine administered. To support the reputation of the medicine, the effect should follow its use in a number of cases sufficient to remove every suspicion of recovery having been casual, or solely dependent upon the resources of the constitution. Without paying due attention to this point, nothing certain can be drawn from experience.

The rapidity with which cholera runs its course, renders it more imperative upon the practitioner to make himself acquainted with its symptoms, their stages and treatment, than with those, perhaps, of any other disease whatever. In relation to the progress of cholera, the value of *time* must be ever uppermost in the memory. The premonitory symptoms are eminently curable, and the first stage of acute cholera is eminently curable; how, then, shall the physician manage to see his patient in time to meet the disease in these tractable periods? By attending, I would answer, to the Preliminary Measures.

Preliminary Measures to be adopted, that the Powers of the Remedies may have a fair trial.

When the cholera enters a town for the first time, the inhabitants are not fully alive to the necessity that exists of having recourse to early

and efficient advice; and the poorest classes, who are more particularly the subjects of its attack, cannot be impressed with a sense of their danger; it therefore becomes the duty of the physician to inquire whether any system of medical organization can be devised to anticipate these evils, and to obviate them.

Towns have been divided into districts, and medical men have been appointed to each, to attend the cholera cases; and yet apparently without having effected any marked diminution in the mortality, when compared with that of localities where such pre-arrangements were not introduced. The failure of these means to compass the ends for which they were intended, may be attributed, first, to the great number of patients attacked about the same time, and the comparatively small number of the medical attendants; secondly, the largeness of the districts of which the medical men had charge, and their consequent inability to furnish speedy advice and assistance to even a portion of the sick.

Persons unacquainted with the peculiarities of cholera, suppose that the accommodation afforded by temporary hospitals is adequate to meet every deficiency occurring in the treatment of the patients at their own homes; but this supposition

is quite erroneous. In England, where the mass of the people are prejudiced against such establishments, and where the sick are not compelled to go into them at an early period of the disease, cholera hospitals never were, and never will be, productive of much public benefit. Nearly all the patients die that are received into the hospitals, and this fact alone is the best proof of their inutility. In general, they have only served to squander parish rates, and, by the shocking mortality apparent in their lists of cases, to lead the misguided populace to accuse the physicians of administering poison to their patients.

Although these attempts at organization have left scarcely an example of success to claim our attention, it by no means follows that they cannot be improved, and rendered efficient in controuling the evils of cholera, when combined with judicious medical treatment. It is not, however, by laying down arbitrary rules for the dividing of towns into districts, and the furnishing of medical advice, that such result is to be anticipated. The practical or working object should be defined, and every arrangement should be brought to agree with, and to advance the attainment of that object. Immediately after cholera has entered a town for the first time, the practical object for opposing its

progress, is to furnish early medical assistance to a portion of the inhabitants, who are slow to seek for it at all times, and who, in reference to this rapid disease, are frequently not seen by the physician before it is too late to render them substantial service. With this practical end in view, the town should be divided and subdivided until it is distinctly marked out into small compact districts, and to each district medical men should be appointed—some for the day-duty, some for the night-duty—to visit exclusively the cases of cholera that may occur. Having proceeded thus far, the succeeding arrangement, to which all others are of subordinate importance, comes to be enforced.

In cases of ordinary sickness, the comparative slowness of their progress affords time to a patient to be made alive to his morbid condition, and when there is cause for alarm, to send for his medical attendant before the symptoms have attained their acmé of virulence ; but in connection with cholera, the transition from a good state of general health to the most dangerous state, is rapid ; and the patient is usually not roused to a proper sense of his situation, before the mild incipient symptoms have become converted into the advanced and deadly. Here, therefore, the common order of

things should be inverted. Instead of waiting to be sent for to the cholera cases, the physician should seek out and make himself acquainted with the patients in their own houses. For this purpose, as soon as one, or a few, unequivocal cases of cholera have occurred in a town, the district physicians will have to commence their anticipatory visits. Every family belonging to the poorer classes of the community, and every family holding intercourse with them—in sickness or in health—should be visited twice daily, during the prevalence of cholera, by a practitioner of the district in which they reside. In this way, cholera will be treated on principles suited to itself, and its three leading features will be our points of guidance: 1st, The rapidity with which the disease runs its course when the symptoms have become severe; 2ndly, The facility with which recovery may be established, when judicious remedial measures are resorted to previous to the termination of the first stage of acute cholera; 3rdly, The intractable nature of the second stage of acute cholera, commonly called the stage of complete collapse, or real debility.

When a town is divided into small, compact districts, and medical men are appointed to each; when these medical men visit regularly twice a day—morning and evening—all the houses likely

to contain inmates susceptible of cholera, and inquire after the bodily condition of such inmates—the healthy as well as the diseased; then, the first important step shall have been taken to diminish the mortality which would naturally follow an inroad of cholera in that locality. Every practitioner, while acting under this arrangement, may see a majority of his patients in a few hours after the commencement of the premonitory symptoms. For instance, in his morning or evening examination of his portion of a district, the practitioner calls upon a family who, from their circumstances, are supposed liable to an attack of cholera. He inquires whether any of its members are unwell, and if answered in the affirmative, he ascertains the symptoms, and decides upon the identity of the disease, of whose approach they are an indication. Should diarrhœa prevail in that family, and have the characters of the cholera diarrhœa, he will not fail to point out to the patient his impending danger, prescribe for the affection, and relax not his vigilance until the warning symptom is subdued, and the natural state of the bowels restored. In like manner he will act regarding vomiting, cramps, &c. Should the first stage of acute cholera have commenced, as may occasionally happen, either in consequence of the

rapid advance of the disease, or the neglect of the patient, in not sending for early advice, the practitioner who looks for the patient may still almost always overtake the symptoms before the curable period is past.

There is no acute and violent disease more curable than cholera, and there is scarcely any idiopathic fever with the nature of which we are better acquainted, than with that of cholera; yet many members of the profession are constantly filling the public ear with statements of our total and peculiar ignorance of the latter, and their disbelief in the former, of these two incontrovertible facts. Their double assertion is linked together as cause and effect—"the nature of the disease being unknown; it cannot be cured"—and so often has this unfounded assertion been repeated, that an attempt to controvert it in general society would at present be fruitless. In the presence of competent judges, however, it cannot escape confutation: one interrogatory is enough, viz. What do we know of the causes, remote and proximate, of intermittent or of remittent fevers? We know just as much of them as we know of the proximate and remote causes of cholera; and yet these fevers may be subdued by the use of bark, or some other remedial course.

Time enters more largely into our consideration in the treatment of cholera, than into that of the other diseases. In the hope of meeting the patient in time, the practitioner has been advised to go in pursuit of him. Having found him, and having prescribed for the peculiarities of the individual case, no time should be lost in carrying the remedial measures into effect. Any considerable delay in the letting of blood, when the operation is proper, or in the supply of the internal medicines, may prove fatal to the patient. The second step of importance, therefore, in the preliminary measures, is to preclude the possibility of this delay taking place. Delay cannot be effectually prevented, unless the practitioner perform the operation himself, when prescribed, or have an assistant near at hand to perform it. And, unless the practitioner have the internal remedies carried about with him in his visits, and dispensed in the chambers of the sick, little dependence can be placed upon their speedy administration. Much delay has been incurred in sending to the shops of apothecaries for their medicines; and multitudes of the cholera patients have undoubtedly perished, that might have recovered had these medicines been prescribed and administered at the same period, instead of at considerable intervals of time.

Although, in my opinion, cholera hospitals will never form a primary feature in any system properly organized to meet the disease, I think they might be rendered productive of some service to the public, if adopted to a certain extent, and made to partake chiefly of the nature of dispensaries. About the centre of every district, a small building, capable of affording accommodation to a dozen, or so, of internal patients, should be provided. Into this no patients should be brought, unless at their own particular request, or that of their relatives, and unless their own houses are without the means of applying external warmth to their bodies. The internal accommodation of cholera dispensaries will be to furnish a place of refuge almost exclusively for the destitute sick—paupers, travellers, &c.—who happen to be attacked, and who are unable to procure lodgings and medical assistance, save from the hand of charity.

To each dispensary an apothecary should be attached, to take charge of the inmates during the absence of the visiting practitioner, and to prepare in doses, and hold in readiness, for the use of the district in which it is situated, a quantity of the medicines which have been found most useful in the management of the disease.

If the remedies most efficacious and essential in the treatment of the premonitory symptoms, and of acute cholera, were enumerated apart from those of inferior power, and that are not essential, the practitioners who are about to treat the disease for the first time would be greatly assisted. The rapid progress of acute cholera does not admit of indecision, or of laboured and elegant forms of prescription. The remedial means require to be confined within the narrowest limits which are consistent with the safety of the patient and the speediest method of cure. Some of them, however, may be varied on principle; as at times when an emetic is to be given, it may matter little of what the emetic is composed, provided it will excite artificial vomiting to a certain extent—and the same may be said of the common purgatives. The remedies which I have found quite sufficient for general purposes, are few in number, and are comprised in the following list:—Blood-letting, from the veins of the arm, or from the temporal arteries; emetics, composed of ipecacuanha and tartrite of antimony, or of mustard; purgatives, of castor oil, or of rhubarb, or of jalap, or of jalap and calomel, or of calomel with capsicum; alteratives, of calomel and opium; dry heat applied in bottles of hot water rolled in flannel, or heated bricks, or sand, bran, &c.

The different steps of the preliminary measures* may be summed up thus:—

A town, threatened with an inroad of cholera, should be divided throughout into small compact districts. To these districts medical men should be appointed to attend the cholera cases exclusively, and in numbers sufficient to pay a morning and evening visit to every house likely to contain persons affected with or susceptible of cholera, or persons who have had intercourse with them. After one or a few cases have occurred in this town, the district practitioners should commence making their morning and evening visits, and they should continue to do so regularly while the cholera prevails. In their visits, they should inquire after the bodily condition of all the suspected inhabitants—the healthy as well as the diseased—and endeavour to win their confidence,

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* These preliminary measures are more particularly for the benefit of the poorer classes, where the cholera is expected to prevail extensively; but individuals in the higher walks of life may perceive their object, and act efficiently, independent of them. Such individuals, if seized with symptoms of the disease, will almost always recover, in case they procure proper medical treatment within two or three hours after the commencement of the attack—which ought not, in ordinary circumstances, to be a very difficult matter.

that they may be easily led to submit to professional advice when brought to their doors, and to send for it in the intervals of the regular visits, when a severe and rapid attack has rendered it necessary.

A dispensary should be established about the centre of every district, to afford hospital accommodation to the destitute inhabitants of the district who are desirous of becoming its inmates. The apothecary attached to the dispensary would have to take charge of these inmates during the absence of the visiting practitioner; and it would be also his duty to have an abundant supply of portable medicines constantly prepared for the use of the district.

These portable medicines should be prepared in doses, and enclosed with a couple of lancets, in a small case, to be carried in the pockets of the district practitioners, so that during their visits they may always have a supply of internal remedies at hand. Each dose of the medicine should have a label on the outside, showing the name and quantity of the ingredient or ingredients of which it is composed. Subjoined is a list of the portable remedies, in doses, fitted to adult patients—the doses for children to be adapted to their ages and constitutional strength.

PORTABLE MEDICINES.

Emetics, with their Doses.

The Compound Emetic is composed of one grain of tartrite of antimony, with twenty grains of the powder of ipecacuanha.

The Mustard Emetic is composed of two drachms of powdered mustard.

Purgatives, with their Doses.

Calomel Bolus—Five grains of calomel with two grains of powdered capsicum.

Jalap Powder—Twenty grains of jalap with four grains of ginger.

Calomel with Jalap—Five grains of calomel and fifteen grains of jalap.

Alteratives, with their Doses.

Calomel and Opium Powders—Two grains of calomel in each, with a quarter of a grain of powdered opium.

Castor oil will be frequently required as an invaluable purgative—it is not included in the portable case, as every family should have a quantity of the oil in their own possession. Fifteen or twenty drops of laudanum, mixed with an ounce or half an ounce of castor oil, is an advantageous combination, where there is much twisting or uneasiness in the stomach or bowels; and a small phial of laudanum may be added to the contents of the case, for the purpose of affording these doses of the remedy without delay.

I have now described the preliminary measures, and the remedies, with the doses in which they should be administered. The results of this very simple plan of organization, and of the exercise of a sound judgment in the practical department, will, whenever they are rigidly carried into effect, reduce the mortality among the cholera patients to a comparatively small amount. In venturing to estimate the reduced mortality among patients so treated, at not more than *one in ten*, I feel that I am not sanguine—and in expecting the reduction to be carried, in some hands, to the extent of *one in fifteen* of those attacked, that I should not incur the suspicion of being enthusiastic.

As yet, however, there has not been any town organized, during the prevalence of cholera, in the way which I have just recommended, and, consequently, it may be inquired, "on what grounds do I advance these opinions?" They are drawn from my course of observation in the north of England, and from the sum of my experience of the disease, in every locality where I have had an opportunity to watch its progress. The defects apparent in the attempts at systematic arrangement of the preliminary measures in this country, and the fluctuations in the plans of treatment, were beacons to be seen and avoided. The

portion of success, moreover, attendant upon the different plans, appeared always to increase as they approached to the principles of that which I have endeavoured to delineate.

The approximations to the present system which were attained within the circle of my own practice, have afforded evidence to me quite satisfactory of the value of such a course; and in the hope of leaving a similar conviction on the public mind, an example shall be offered in this place:—

I was engaged, the 13th of January, 1832, by the owners of the Hetton Collieries, in the county of Durham, to take superintending medical charge of the Township of Hetton, where the cholera then prevailed to an alarming extent. As it bears upon the treatment and preliminary measures which were adopted, I shall enter into a topographical sketch of the Township.

The Township of Hetton contains 6,500 inhabitants, and it is chiefly composed of three villages, called respectively, "Hetton," "the Downs," and "Easington Lane." These villages lie nearly in a line, and are about half a mile apart from each other; making a walk of nearly three miles from end to end. The village of Hetton contains a population of 2,000; the Downs, 1,500; and Easington Lane, 3,000. Hetton is situated between

the other two, and the local medical practitioners, three in number, reside in Hetton. Nearly the whole of the male part of the population is employed in the coal-pits, and persons belonging to this class work indifferently by day or by night, as their services may be required. They earn high wages, and live irregularly.

To furnish early advice and medicines to the patients in the Township, was difficult; they were scattered over a considerable space of country. The local practitioners, moreover, resided in the village of Hetton, and as all the medicines prescribed by them in either the Downs or Easington Lane, were prepared at their places of residence, the inhabitants of the latter villages, when unwell, had, on ordinary occasions, to wait a considerable time before they could obtain a supply. In the hope of obviating this delay as far as was possible, the greater part of the medicines were dispensed in the houses of the sick, and an arrangement was made for the letting of blood, which will be presently explained.

Blood-letting, in the first stage of acute cholera, is universally applicable—in the old and in the young, in the weak and in the robust. This sweeping statement in favour of blood-letting will startle many who have a sound knowledge of

medicine, and who are consequently well aware that its conclusions, when extended and correct, are very rarely unqualified; but, here, the fact is so; and until its truth is generally admitted as an exception to the rule, the most certain method of subduing cholera in the incipient periods will not be generally understood. The only question for the consideration of the practitioner is the quantity of blood to be taken in any particular case—for the quantity should be graduated to a greater or less extent, according to the age and constitution of the patient, and the character of the symptoms.

Blood-letting is a tedious operation, and the local practitioners at Hetton, having their other professional duties to look after, could not command time to speedily perform it themselves in all the cholera cases that were occurring; and even if their services had been devoted exclusively to cholera, some assistance would have been required to enable them to have blood drawn from their patients in quick succession. Moreover, when severe attacks commenced at night in the Downs village, or in the village of Easington Lane, a long period of time necessarily elapsed before the surgeon who had been sent for to Hetton could arrive to let blood. For these reasons, the employ-

ment of unprofessional persons to perform blood-letting was tried as an experiment, and it was attended with marked advantages. Three individuals, one in each village, were found capable and willing to fill the office of "Bleeders." They were accordingly engaged as such; and to reward them, one shilling was allowed by the Board of Health for every case in which their assistance was wanted and promptly afforded.

At first, the *bleeders* were only permitted to operate upon receiving the verbal or written order of the medical attendant to that effect, and the quantity of blood to be taken was specified in the order; but after they came to be familiar with the practice, and with the symptoms of the disease, permission was extended to them, under certain circumstances, to act partly upon their own discretion. In the attacks commencing at night, where the danger of the delay incurred by waiting for the medical attendant threatened to be considerable, the bleeders might proceed of themselves to draw blood to the extent of three tea-cups'-full (fifteen ounces) in strong adult patients, and to the extent of two of these measures (ten ounces) in adults of weak constitution. By this, the progress of the attack was checked or retarded, and when the medical attendant arrived, he usually received

his patient in a favourable state for the administration of the internal remedies, and for the repetition of the operation, if deemed necessary; whereas, had the disease been left to its natural course, the symptoms, in many instances, would have been advanced, previous to the period of his arrival, beyond the control of his art.

Owing to the number of the cases, and the manner in which they were scattered through the Township, the visits of the practitioners were not as frequent and punctual as could have been wished. Among the inhabitants generally of the Township—the healthy as well as the diseased—a morning visit was made, and those patients who were severely ill received a visit both in the morning and in the evening; but it often happened, as the attacks of cholera generally occurred during the night or very early in the morning, that the practitioners, when sent for in these intervals of their regular attendance, could not furnish assistance to all, with any thing like proper despatch. Under every disadvantage, however, the results of the preliminary measures and treatment which had been adopted, were highly satisfactory. A statement of the numbers of persons attacked, and of the deaths and recoveries, during the inroad at Hetton, has been published

by Mr. Wood, the manager of the Hetton Company, with the concurrence of Mr. Edger, the Company's local surgeon. In this statement, which I may be permitted to quote, the inroad is divided into three periods, marking the progress of the cholera in the Township before my arrival at Hetton—its progress during my stay there—and its progress after my departure. Mr. Wood observes,*—

1*st Period.*—" Before Mr. Kennedy came to Hetton, there had been 49 cases of cholera, of which 17 died....1 in 3.

2*nd Period.*—While Mr. Kennedy had charge, 221 cases, of which 23 died ....1 in 10.

3*rd Period.*—After Mr. Kennedy's departure, 85 cases, of which 15 died .... 1 in 6."

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* Every thing relating to the results of any particular practice in cholera, should be established in the most unequivocal manner; and for this reason I may state, in regard to the comparative mortality in the different periods at Hetton, that the reports of the cases were composed and transmitted to the Government by the *local* practitioners themselves. If the comparative mortality had been higher in the middle period than is specified above, it would have been the interest of the local practitioners to make known the fact, and bring the rate nearer to that of the first period, when they had the sole charge of the Township. No cases of diarrhœa alone, or of the other premonitory symptoms, were included in these reports.

The variation in the ratio of the mortality in the different periods is here very remarkable, and I know of no way to account for it satisfactorily, unless by admitting that the preliminary measures were more efficient in affording early medical assistance at one period than at another; and that the assistance, when obtained, was in itself more powerful at one period than at another, or more successful from its speedy application. In my opinion, the contrast between the first and second periods was chiefly produced by a change in the mode of treatment. In the first period, while the mortality amounted to one in three of those attacked, brandy and laudanum (as I was informed by Mr. Edger) were the remedies chiefly relied on—purgatives were sparingly administered, and although blood-letting had been resorted to, its use was not uniform, nor the extent of its powers clearly perceived or defined. In the second period of the inroad, on the other hand, when the mortality decreased to one in ten, blood-letting had formed the sheet-anchor of the remedial agents, and purgatives were freely prescribed, but brandy was abandoned nearly altogether, and rarely was laudanum exhibited, save in doses of twenty or thirty drops, combined with castor oil.

The division of the local inroad at Hetton into three periods, with the record of its progress in each, affords strong testimony in favour of the particular treatment which seemed to be the most successful. It shews that the disease itself underwent no change to which the diminution in the mortality might be attributed; for, according to the opinion of those who believe in the rapid amelioration of the symptoms of epidemics in their local progress, the cholera should have been much more fatal during the middle period of the inroad, than in the after-period comprehending its decline; but the contrary was the fact. During the *first* week of its extended prevalence, the mortality amounted to one in three—while in the *second* week, and immediately after the new arrangements were introduced, the mortality fell to one in ten—subsequently to the *fifth* week, it again increased to one in six.

My being at Hetton in the middle period of the inroad, augmented the number of the practitioners from three to four; and this enlargement of the means of furnishing advice may, in the estimation of some, be considered as one cause of the diminished mortality;—it should, however, be observed, that the cases on the sick-list in the middle period, were at least twice as numerous as before

or after—and therefore the larger share of professional duty was divided amongst the four, and the sum of their individual labours was, at this time, greater than when only three remained to manage the practice.

While I had charge at Hetton, twenty-three patients died out of two hundred and twenty-one.* Now, it will prove equally instructive to explain the circumstances which caused the death of the twenty-three, as to explain those of recovery in regard to the one hundred and ninety-eight.

The great value of time in the treatment of cholera, has been repeatedly described, and, looking for the cause of death among the twenty-three, I feel assured that all these patients perished as an indirect consequence of their not having been seen in time to give the remedies a fair trial. Had they received proper assistance within the lapse of a few hours subsequent to the commencement of their attack, my conviction holds that scarcely a single patient would have died. To enable the reader to draw his own conclusions, I

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* I cannot omit returning my best thanks to Mr. Edger and the other surgeons at Hetton, whose zeal and liberality were instrumental in compassing these results, and without which every exertion on my part, as an individual, would, among so numerous a population, have been spent in vain.

subjoin an outline of the fatal cases, showing the state of the symptoms when first seen by the medical attendants, the remedies prescribed, their effects, and the issue.

OUTLINE OF THE FATAL CASES.

Case No. 1.—Robert Turnbull, aged thirty-four years. About half-past two o'clock, A. M. of the 14th of January, was seized with diarrhœa. At half-past eight o'clock vomiting began, and also cramps in his legs. He was then sitting in a chair, and the cramps caused him to jump up "as if he had been shot." He was carried to bed immediately, and medical aid was sent for. A few powders only were administered.

I saw him for the first time at one o'clock, and he was then cold, blue, and pulseless, and presented all the symptoms of the second stage of acute cholera. It was now too late to perform blood-letting. An ounce of mustard was administered, and free vomiting followed; but he continued to sink without presenting any attempt at reaction, and he died at half-past four o'clock.

2.—William Bennett, aged twelve. Went on Saturday, January 14th, to the funeral of his mother, who had died of cholera. On Sunday he

dined heartily, at one o'clock, P. M., and appeared to be in perfect health, but about three o'clock, he was seized with diarrhœa. At four o'clock, complained of sickness of stomach, and vomiting began almost immediately after. The vomiting and purging continued, and he was obliged to go to bed. Medical assistance could not be procured before seven o'clock. Blood-letting was then attempted, but not more than a table-spoonful of dark tarry blood was obtained. The mustard emetic was given. He continued to sink, and expired at half-past seven o'clock, the ensuing morning. This patient had no cramps in his extremities during the whole progress of his attack.

3.—Mary Bateman, aged thirty-two. At six o'clock, P. M. on Tuesday, was seized with a feeling of great oppression, and in the lapse of a few minutes, with severe vomiting. Had been engaged a short time before symptoms commenced, in cleaning the furniture of a person who died of cholera. About three o'clock, A. M. of Wednesday, purging began, and soon afterwards the cramps. Was seen by her medical attendant early in the disease, but would not then submit to have blood-letting performed.

Symptoms continued to advance, and between eight and nine o'clock of this morning, she at last became willing to lose blood, and her friends pressed her attendant to perform the operation. It was then, however, too late, and no blood could be procured. She died at six o'clock, P. M.

4.—Thomas Carr, aged three years and a half. During the evening of Sunday, his mother carried him with her when visiting a cholera patient, of the name of Reay. About ten o'clock, P. M. of Monday, he started from sleep, and complained of pains in his bowels. Purging commenced almost immediately, and to this vomiting was soon added. Blood-letting was not attempted. I saw him fifteen hours after he was first seized, and he was then in the second stage of acute cholera, with slight appearance of approaching reaction. The febrile symptoms imperfectly established themselves, and he lingered in the chronic cholera until the fifth day of his attack, when he died. Passed urine in small quantities from the beginning.

5.—Mary Carr, aged thirty-five. On Wednesday was in perfect health, and engaged in nursing her child, the preceding Thomas Carr, who was ill of cholera. About four o'clock, P. M. of that

day, was seized with severe purging, and at five o'clock, A.M. of Thursday cramps were experienced in feet, legs, hands and arms. Blood-letting was not attempted until ten o'clock. It was then too late to obtain more than half a tea-cupful of black tarry blood. She died at one o'clock, P.M., without having showed any signs of reaction. This patient had no vomiting during the whole progress of her attack.

6.—William Kirkley, aged forty-five. Fourteen days previous to this date (January 19th) attended the funeral of a cholera patient named Loudon. Five days ago was seized with diarrhœa, and vomiting began on yesterday morning. Has had little cramps, but complains of pains in hollow of right foot. He is at present in the second stage of acute cholera, completely collapsed. Blood-letting was attempted last night, but only a small quantity could be obtained. He died on the 20th, without having showed any signs of reaction.

7.—George Stoves, aged twenty. At two o'clock, A.M. of Wednesday, complained of general uneasiness and pains in his bowels, and about five o'clock, was seized with vomiting and purging. Towards the hour of breakfast, symptoms con-

siderably abated, and he ate a little, and afterwards tried to pursue his work, which was that of a shoemaker. By ten o'clock, however, symptoms had again become aggravated, and they now rapidly advanced. Advice was procured about half-past eleven o'clock, but only five ounces of thick dark blood flowed. He remained in the second stage of acute cholera, until twelve o'clock, P. M. when he expired. Complained, during his attack, of violent cramps in his legs, but in no other part.

8.—Jane Richardson, aged five. Was seized with cholera on Sunday. I first saw her the day after, and she was then in the second stage of acute cholera. Vomiting had ceased, and the rice-water fluid passed from her bowels involuntarily. Reaction, however, appeared during Tuesday, and she lingered in the fever until Saturday, when she died. Blood-letting was not attempted in this case.

9.—Mary Frier, aged twenty. Was seized on the morning of Friday with purging, and soon afterwards with vomiting, and with cramps in her feet. Being pregnant, and near the proper period of her delivery, labour pains came on about nine o'clock,

P. M., and she was delivered with facility in three quarters of an hour. Vomiting and purging were less frequent after this, but cramps continued as before, and debility became extreme. At four o'clock, A. M. of Saturday, blood-letting was tried for the first time. She was now, however, in the second stage of acute cholera, and only one ounce of black thick blood could be obtained. She died the ensuing morning, without having exhibited any attempt at reaction.

10.—Hannah Spooner, aged thirty. During two days previous to January 21st, had suffered from twitching and feeling of numbness in limbs, and giddiness in head. These premonitory symptoms commenced three days after she had been visiting Adam Elliott, a cholera patient. Was bled, with temporary relief; but as she did not confine herself to bed, and take proper precautions after the blood-letting, the symptoms of acute cholera became developed at five o'clock of the morning of the 21st. At this time she was pregnant, and within a fortnight of the usual period of delivery. Medical assistance could not be obtained until twelve o'clock. It was then too late to procure blood. She was cold, blue, and pulseless. The mustard emetic was exhibited.

Continuing to sink in the collapse, she died about seven o'clock, P. M., without having presented any symptoms of reaction.

11.—Ellen Spraggin, aged forty-one. Was visiting during Friday, the house of a person of the name of Young, where a boy had recently died of cholera, and where Mrs. Young and her daughter were suffering under premonitory symptoms. About half-past one o'clock, P. M. of the Sunday following, Mrs. Spraggin was seized with diarrhœa. At seven o'clock, vomiting began, and also cramps in feet and legs. The medical attendant saw her about nine o'clock, and he let blood from her arm to the extent of sixteen ounces, and administered two mustard emetics. After the use of these remedial measures, the symptoms were relieved for a time. They soon, however, returned in their former violence. She expressed her belief that she would never recover. Died in the collapse at half-past eight o'clock, A. M. of Monday.

12.—Thomas Ferry, aged forty-eight. His wife died of cholera, and soon afterwards he was seized with frequent purging and occasional vomiting. Symptoms gradually increased in severity, but he did not procure medical advice until two days had

elapsed. It was then too late to obtain blood. The mustard emetic was given. He died in the collapse during the third day. This patient had no cramps.

13.—John Stones, aged fifty. During Thursday complained of twisting pains in abdomen; on Friday, severe purging began; and in the course of Sunday morning, vomiting was added to the other symptoms. At two o'clock, A. M. of Sunday, cramps first began in right leg, and they soon extended to left arm. Medical assistance was not obtained before night, and it was then too late for blood-letting. The patient had reached the second stage of acute cholera. He died on Monday, about one o'clock, P. M. without having presented any symptoms of reaction.

14.—Barbara M'Cree, aged nine. About twelve o'clock at night of the 22nd of January, was wakened from sleep by a feeling of nausea, and this was quickly followed by vomiting and purging. At the end of two hours, cramps began. Medical assistance was not procured until seven o'clock of the ensuing morning. It was then too late to freely obtain blood. The mustard was given. She died in the collapse about two o'clock, P. M. of the 23rd.

15.—Jane Stoves, aged twenty-eight. Was seized with diarrhœa, a short time before her brother George died of cholera. Diarrhœa had continued four days, when (January 22nd) vomiting began. Medical attendant tried to let blood in the erect position; but as she fainted almost immediately, not more than one ounce of blood flowed, and he unfortunately did not persevere in his efforts. At the time I first saw her, she was in the collapse, cold, blue, and pulseless. Died in it, on the morning of the 24th. Had no cramps.

16.—Jane Elliott, aged ten. Complained of twisting pains in abdomen, nausea, and numbness and coldness in legs, at eight o'clock, P. M. of Tuesday. At this time her mother was lying ill of cholera. Symptoms continued, and about one o'clock vomiting commenced, and the purging soon afterwards. Medical assistance was not procured until half-past four o'clock, and it was then too late to obtain blood. She died in the collapse at one o'clock, P. M.

17.—Mary Hailes, aged five. About one o'clock, in the morning of Saturday, was seized with purging and vomiting. Symptoms became

severe, and there was much general oppression. Medical assistance was obtained at nine o'clock, A. M., but it was too late for blood-letting. She passed into the second stage of acute cholera. Had no cramps.

Reaction became apparent during the night, and on Sunday the fever had fairly commenced. She lingered in the fever until Tuesday, and expired during that day.

18.—Alice Crawford, aged four. Her father had recently been labouring under cholera, when about six o'clock, A. M. of Saturday, this child was seized with severe vomiting and purging. About three o'clock, P. M. she was in the second stage of acute cholera, and no blood could be procured. Passed into a partial state of reaction, but sunk under its symptoms at twelve o'clock in the night of Wednesday.

19.—James Lee, aged seventy. About four o'clock, P. M. of Wednesday, was seized with purging, and at seven o'clock, vomiting and cramps began. At the time of his attack, there was no person in the house where he lived save himself, and he lay for three hours after the cramps had commenced, before he was enabled,

by an interval of relief, to crawl to the door of his next neighbour, and beg for assistance. Medical aid could not be procured until twelve o'clock; it was then too late to obtain blood. He died in the collapse, at six o'clock, A. M. of Thursday.

20.—Isabella Johnson, aged thirty-three. Had been in the habit of visiting cholera patients, and of sitting up with them at night. During upwards of a fortnight previous to her attack, about to be described, she had complained of flatulence in stomach and bowels, nausea, numbness, and feeling of coldness and pricking in legs. During some days also, she had purging, which, however, subsided spontaneously. On the 27th of January, she was visiting Richardson, a cholera patient, and she held the cup to his arm while blood-letting was being performed. About half-past seven o'clock, A. M. of the 28th, was seized herself with violent symptoms. At half-past three o'clock, purging and vomiting were frequent, and she complained much of a feeling of general oppression. She was very restless, and her face had a strong expression of anxiety. Blood was now freely drawn from her arm; an emetic was administered, and afterwards a bolus.

Did not appear to rally after the treatment.

Vomiting and purging subsided about seven o'clock, P. M. Cramps then commenced in hands and arms, feet and legs. She continued to sink, and died in the collapse at two o'clock. Subsequent to the death of this patient, it was discovered that she had taken, during her illness, of her own accord, a quantity of the infusion of tobacco. She had prevailed upon the woman who acted as her nurse to prepare it, and the fatal issue of the case was probably the result of its poisonous influence.

21.—Mary Watson, aged forty-six. Had severe purging, giddiness, and nausea, during the whole of Saturday, and in the night complained of twisting pains in the abdomen. Vomiting began between twelve and one o'clock, and symptoms rapidly increased in violence. Medical aid was not procured until seven o'clock, A. M. of Sunday, and she was then in the stage of collapse. Blood-letting was attempted, and only an ounce of black tarry blood could be obtained. Died at half-past six o'clock, P. M. without having presented any symptom of reaction.

22.—George Soulsby, aged thirty-three. For five days previous to January 25th, had complained of diarrhœa, for which he was bled to eight

ounces. Took little care of himself after the blood-letting, and in the evening of the 25th, severe symptoms of cholera commenced. Blood-letting was not repeated, and he passed into the collapse. By the evening of the 26th, symptoms of reaction became apparent. He died in the febrile period on the 30th.

23.—Mary Ann Errington, aged two. About three o'clock, A. M. of January 31st, was seized with cholera, and symptoms rapidly increased in severity. She died in the collapse, at half-past four o'clock, P. M. of the same day. Her parents had no suspicion that her disease was cholera, or one so rapid in its progress, and therefore they did not send for medical advice until after one o'clock, P. M. The messenger had a considerable distance to travel, and before the practitioner arrived, the child was dead.

In this outline of the fatal cases are inserted the *times* which had elapsed from the commencement of the symptoms before blood-letting was attempted. In seventeen of the cases, the operation was not had recourse to until it was too late to obtain blood—the blood had forsaken the superficial vessels of the body, and had become

of a black colour, and, in consistence, thickened like oil or tar. In four of the cases, blood-letting was not tried at all during the acute symptoms; and in two cases, those of Spraggin and Johnstone, blood was freely discharged. In my opinion, Johnstone died from the improper use of the infusion of tobacco; and Spraggin probably in consequence of the blood-letting not having been repeated, when the symptoms which demanded its use in the first instance, returned in their original violence. A tabular form may place these circumstances in a clearer light.

In the following seventeen cases, blood-letting was not tried until it was too late to obtain a free discharge of blood.

Blood-letting was tried,	After the Premonitory Symptoms had commenced.	After the Acute Cholera.
In William Kirkley	4 days	11 hours.
Jane Stoves	4 days	8 hours.
John Stoves	3 days	8 hours.
Hannah Spooner	2 days	7½ hours.
Mary Watson	21 hours	6½ hours.
Mary Carr	18 hours	5 hours.
Mary Bateman	14 hours	6 hours.
R. Turnbull	11½ hours	5 hours.
George Stoves	9½ hours	6½ hours.
Ellen Elliott	8½ hours	3½ hours.
James Lee	8 hours	5 hours.
William Bennett	4 hours	3 hours.

Blood-letting was tried,	After Premonitory Symptoms had commenced.	After Acute Cholera.
In Thomas Ferry...	*No premonitory symptoms* ..	48 hours.
Mary Frier	Ditto.....	24 hours.
Alice Crawford	Ditto.....	9 hours.
Mary Hailes.....	Ditto.....	8 hours.
Barbara M'Cree.....	Ditto.....	7 hours.

In the following two cases blood-letting was freely performed :—

Ellen Spraggin	7½ hours.....	2 hours.
Isabella Johnstone	14 days	8½ hours.

In the following four cases blood-letting was not tried at all, during the acute symptoms :—

George Soulsby,
Jane Richardson,
Mary Ann Errington,
Thomas Carr.

Taking the most unfavourable view of the effects of blood-letting amongst the patients at Hetton, during the period of my stay there, not more than two patients, out of two hundred and twenty-one, can be said to have died after the use of this powerful auxiliary, and the cases of recovery differed in nothing from the cases of death, save that the former were not so far advanced in the disease. No rule, however, can be given to mark

within what period of time a patient should be seen, in order that the remedies may have a fair trial. The symptoms advance with greater or less rapidity in different patients, and the duration of the curable period, when measured by time, must vary accordingly. In some patients, the premonitory symptoms precede for days the commencement of the severe attack; in others, these symptoms are limited to a few hours. In a rare case, the course of the premonitory symptoms is included within a single hour; and, in a still rarer case, the first stage of acute cholera sets in at once, without having been preceded by any premonitory indications. The first stage, again, of acute cholera, which is very curable, and therefore claims especial notice, occupies, in many patients, twelve hours in running through its course. An occasional case, however, is met with, in which it extends to twenty-four hours, or upwards; and, less frequently, a case occurs in which this stage is comprised within three, or perhaps, as an extraordinary instance of rapidity, within two hours. While drawing these conclusions, it should be remarked, that the cholera in England is by no means so rapid in its progress as it is generally supposed to be. In a very large majority of the cases, proper medical

advice will be in time to save the patient, if furnished within several hours after the symptoms have commenced. No patient was lost at Hetton, of the two hundred and twenty-one, with the exception of Bennett, Elliott, and Johnstone, who received proper assistance within the period of nine hours and a half after the commencement of the premonitory symptoms, and five hours after the commencement of the acute cholera.

SYMPTOMS AND TREATMENT OF CHOLERA, WITH EXAMPLES OF RECOVERY.

As the reader is in possession of the preliminary measures which will promote the success of, and are adapted to, the treatment of cholera on a large scale, and as he is also made acquainted with the remedies which I have found, in practice, worthy of confidence, and efficient in controlling the disease in its earlier progress, it now remains for me to describe the symptoms in connection with these remedies, and to state the results of their application, in some instances, by way of example.

Premonitory Period.

The duration of this period is generally comprised in one or two days; but it may extend to fourteen days and upwards, or be contracted to an hour, or less.

Diarrhœa, as a premonitory symptom, is the most common precursor of acute cholera. The pestilential diarrhœa may be ushered in with any of the other premonitory symptoms; but most commonly it is found to have existed in the simple form, or accompanied merely by numbness, during a considerable period, before any additional symptom is developed. The evacuations are urgent, but usually they are performed without pain in bowels, or tenesmus, and probably on this account the patient is slow to take medical advice for diarrhœa alone. The quality of the discharge which constitutes the diarrhœa, varies at different periods of its progress. At first, while incipient, it may differ little in appearance from a healthy evacuation, with the exception, perhaps, of the bile being vitiated in colour, and darker than natural. With more or less rapidity, however, the discharge becomes watery, assuming the appearance common to acute cholera, and in which no trace of bile can be detected. It is then com-

posed of a semi-transparent fluid, resembling water in which a little rice has been boiled; occasionally the fluid is of a brownish or greyish colour, and in consistence approaching to that of gruel. The general health of the patient suffers little under the diarrhœa. The pulse remains natural, or nearly so. The tongue is in many cases unaffected, but frequently it is florid, and towards its centre somewhat brown and dry.

The treatment to be prescribed is very plain and efficacious. Two or three doses of the alterative powder, (one to be administered every third hour,) followed by a dose of castor oil, will in general be sufficient to check the diarrhœa; and a repetition of this course will commonly restore the natural secretions of the bowels. Should the diarrhœa, however, still continue, or the evacuations still appear destitute of bile, some purgative medicine should be given occasionally, and even the doses of the alterative may require to be repeated a third time. Instead of the alteratives, I have often given, in the first instance, a bolus of calomel with capsicum, and, in two or three hours, a dose of castor oil or jalap. This course repeated daily, for two or three days, has been very successful.

The cases of diarrhœa, where there is no con-

stitutional disturbance, that resist the above plans of treatment, are very rare; and when an obstinate case does occur, or when to diarrhœa are added other premonitory symptoms in a severe degree, as giddiness, headach, &c., an emetic should also be prescribed, and blood-letting, to the extent of fourteen or sixteen ounces in a strong adult patient, and to a proportional extent in the young and weak. When treated correctly after this manner, I have never witnessed the premonitory diarrhœa advance in a single instance to the dangerous symptoms of acute cholera.

Twisting Pain in stomach and bowels, existing either alone, or in conjunction with nausea, numbness, giddiness, ringing in the ears, &c., is, next in frequency to diarrhœa, a leading premonitory symptom—and the treatment of the premonitory period will be considered under these two leading features. In cases commencing with twisting pain, and which are left to their natural course, the act of vomiting frequently precedes that of purging. When the purging is established, the pain is usually diminished or removed.

Previous to the appearance of purging, the treatment will consist in the administration of an emetic, composed of one grain of the tartrite of antimony, with fifteen grains of ipecacuanha;

after the artificial vomiting has ceased, a bolus containing five grains of calomel and two grains of capsicum; and in a few hours after the bolus, a dose of castor oil, containing fifteen or twenty drops of laudanum, to produce a free alvine discharge, and to remove irritation. If any symptom remain when the action of these remedies is over, an occasional dose of jalap or some other purgative will subdue it. As in diarrhœa, blood-letting may be required to overcome an obstinate case.

In the management of the premonitory symptoms at large, a sinapism to the abdomen is sometimes useful; but the common blister is rarely required, unless as the means of confining patients to their beds, who might otherwise through carelessness expose themselves to cold, or other improper influences.

ACUTE CHOLERA.

This period of the disease is divided into two stages:—

The First Stage generally extends to twelve hours; but occasionally it extends to twenty-four hours and upwards, or is contracted to five hours or less.

The Second Stage generally extends to twelve hours, but it rarely extends much beyond that, or is rarely contracted much within six hours.

When the premonitory symptoms have become severe, and are attended with constitutional disturbance, acute cholera may be said to have commenced. Cases exhibiting at their onset this marked form of the disease, are comparatively unfrequent. The First Stage of acute cholera yields in general, with more or less facility, to judicious treatment. Over the Second Stage, internal medicines have little beneficial influence.

Many persons suppose that the skin of a cholera patient is deadly *cold,* even from the commencement of the disease, and that the circulation is considerably impaired. This is a great mistake, and it has been one and a principal cause of the difficulty which medical men have experienced in establishing the identity of the disease, when they happened to see it early and for the first time. The extreme coldness, and other appearances indicative of great depression in the vital powers, come on not in an instantaneous, but in a gradual manner. In England, their development in the most rapid cases has commonly occupied three or

four hours; and in ordinary cases, several hours have been required to complete it. I have seen cases that had received no medical treatment, and that terminated eventually in the symptoms of complete collapse and death, in which the heat of skin was *above* the natural temperature for twenty-four hours and upwards after the commencement of the acute cholera.—These observations apply to the natural course of the symptoms, apart from any thing casual; for they often commence in patients of the poorer classes, when their bodies are chilled by exposure to atmospheric cold and wet; and this circumstance, which accelerates its progress, should not be confounded with the effect of cholera itself.

First Stage of Acute Cholera.

There is vomiting and purging of the rice-water fluid, and cramps are felt in the limbs. In some cases, the body maintains its natural temperature for a considerable time, and the pulse is scarcely affected; in others, the temperature gradually diminishes from the onset of the severe symptoms, and the pulse is somewhat small and quick; while in a third set of cases, the temperature rises rather above the standard of health, and the pulse is full and somewhat accelerated. All of

these cases, however, if uninterrupted by medical treatment, and provided the constitutional resources of the patients are unable to resist them, will sooner or later put on a similar appearance. The circulation then becomes gradually less distinct in the superficial vessels of the body, and the blood is gradually deepened in colour, and its fluidity is gradually diminished—the animal heat declines, and the skin becomes covered with a cold, clammy perspiration—the voice becomes husky—a dark-coloured areola surrounds the eyes—much thirst, and a sensation of heat or pain at the epigastrium, are complained of, although the tongue is moist and pale—the secretions are suppressed—the patient either is restless and anxious, or he appears to suffer under some internal cause of oppression, to which his constitutional strength is gradually and resistlessly yielding.

In the treatment of this, the first stage, the success of the remedial measures will be the more marked, the less the circulation and the temperature of the body have been reduced below the standard of health.

Remedial Measures.—Blood should be taken immediately from the arm; and the quantity should be regulated by the age and constitutional

powers of the patient. If the skin is below the natural temperature, dry heat should be assiduously applied. After these means have been adopted, an emetic should be administered—the compound emetic, in case the first stage is not far advanced; but towards its termination, as there is then considerable exhaustion, the mustard emetic should probably be preferred. It acts almost instantaneously, and produces no feeling of nausea or weakness. As soon as the action of the emetic is over, and the stomach somewhat quiet, one of the alterative powders should be given, and repeated every third hour until three doses shall have been taken, and the last powder should be soon followed by a dose of castor oil; or instead of the alterative, it is often attended with the best effect to administer the bolus, containing calomel and capsicum, and in an hour or two after the bolus, a dose of castor oil.

The quantity of blood drawn at first in adult patients, may be from twelve to sixteen ounces, according to the peculiarities of the case. This, and the use of the internal medicines, will in general either permanently check the advance of the symptoms, or diminish their severity for a time. Should they, however, not yield, or having yielded, again threaten to become severe, the

remedial means may require to be repeated, though probably to a less extent in the matter of blood-letting. But, whether the beneficial effect be partial or complete, we must here, as in every other period of the disease, attend carefully to the patient until the alvine discharges put on their proper appearance. To hasten this certain sign of convalescence, the greatest reliance may be placed in the use of an occasional purgative.

Second Stage of Acute Cholera.

In the second stage, the pulse is diminished to a thread, or it is extinct at the wrist, and the blood is of a black colour, and thickened like oil or tar. The surface of the body is cold and moist. The actions of vomiting and purging, which had been frequent and forcible, are now yielding to the increasing weakness, and the patient is scarcely able to perform these morbid exertions; the cramps are subsiding; the skin is blue on the hands and feet, and the points of the face; the features are shrunk and cadaverous; the eyes turned upwards. At this time young and muscular patients usually have jactitation, and experience some difficulty in breathing; but, in the old and infirm, the respiration is usually calm and free, though extremely weak. The breath is cold, and the voice is reduced to a whisper.

During this, the second stage of acute cholera, the patient is in a state of *real* debility, for as far as it relates to the use of the ordinary remedial agents, the restorative power of his constitution is exhausted. The strongest stimulants may be poured into his stomach without producing any, or more than a very slight and transitory, impression.

The treatment of the second stage will be nearly altogether of a negative character. Overwhelmed by the extreme violence of the symptoms, the resources of the almost exhausted constitution cannot be recruited through the medium of artificial aid, administered by the stomach. The hope of a favourable change must chiefly be entrusted to time and the efforts of nature; and scarcely any thing should be done by the physician,* in the way of lending assistance, beyond the application of dry heat to the body of the patient. By applying heat steadily, to maintain the temperature of the solids and fluids of the system, at a height sufficient to preserve them from becoming decomposed or inert, the patient will have extended to

* The injection of saline fluids into the veins of patients in this stage, has been recently tried, and it is said, with partial success; in the concluding observations, I shall offer a few remarks on this new mode of treatment.

him the only remaining chance of recovery—the chance which a state of collapse, like sleep, sometimes affords. In this passive state of the disease, provided the heat is supported, the vital powers may be enabled to rally, and after a time they may come to act upon and re-animate the animal machine. Examples of success, in these unfavourable circumstances, are not unfrequent in the progress of cholera; many patients who had been apparently dying, and some even apparently dead, have eventually recovered. Under the negative treatment, every hope of recovery will be strengthened, and death, where it does occur, will always be a consequence of the disease, and not of the improper use of the medicines; but when active measures are resorted to, as the copious exhibition of brandy, and such stimulants, in the expectation of counteracting the collapse, the death of the patient may then be directly attributable to these agents—an effect which ought not, if it can be guarded against, ever to happen in the hands of a rational physician.

It is not at the moment of their exhibition in the second stage, that the mischievous influence of copious stimulants is rendered apparent. The stomach has lost its irritability, and the most powerful of these may be administered without

making any sensible impression on its surface, or on the general feelings of the patient. Should the resources of the constitution, however, rally, and succeed in bringing about reaction, the strong medicines which were poured into the stomach, while its functions were paralysed, and retained within it, as in a lifeless vessel, will then be enabled to act, and the violent stimulus thus given to the returning vitality will either check its progress, and destroy the patient, before reaction is completely established, or aggravate the consecutive fever, to the destruction or imminent danger of life. If internal stimulants be tried at all during the period of complete collapse, their doses should be very limited in amount, and carefully discontinued should symptoms of reaction come round.

The Chronic Cholera, or Consecutive Fever.

This period of the disease is generally of about three days' duration; but occasionally it is less, and occasionally it extends to ten days;—very rarely, however, beyond that.

In severe cases of cholera, when the patient survives the acute period, and the symptoms of the collapse begin to give way to those of reaction, the following phenomena are observed:—The cir-

culation, that had been previously extinct in the superficial vessels, slowly returns to them—the deadly coldness of the body is slowly removed by the renewed evolution of animal heat—the functions of secretion are no longer entirely suspended, and their partial operation is evinced in the re-appearance of urine. While these changes are in progress, the patient lies apparently in a state of stupor or coma, but his respiration is not laborious, and he may be roused by a shake and a smart interrogatory. These are the more necessary to rouse him, as deafness is a common symptom at this time.

By this description we perceive that the collapse does not yield rapidly to the common febrile symptoms. The transition is gradual, and the time which is occupied in rendering it complete, varies in length in different individuals. In some, the transition* period is comprised in a few hours; in others it extends to as many days. When the transition is tedious, which is generally the case

* It is this, the *transition period*, that many observers call "congestive typhus;" but its phenomena are those of the collapse yielding to the common febrile symptoms; and, partaking of the nature of both, they cannot, with propriety, be said to belong to either, unless we look upon the whole disease as a fever, the chief divisions of which are a cold and a hot period.

in children, the patients commonly die either before, or soon after the change is completed.

In cases where the symptoms of the collapse have been completely superseded by the symptoms of reaction, the morbid appearances under which the patients suffer, resemble those of ordinary fever, and their type will be regulated by the character of the acute stages. When the disease is severe, and is left to its natural course, and the patient survives the collapse, the fever is of the typhoid type, and the symptoms dangerous. When early and efficient treatment has been adopted, the type is of the inflammatory character, and the symptoms mild; and when the treatment has been partially efficient, or somewhat late, it usually assumes the intermediate type.

As in the collapse, little treatment is required while the patient is undergoing the transition, but that little should be directed with judgment. The return of heat to the body is to be encouraged until the temperature is equal to the standard of health; and it should not be permitted, by any neglect, to sink below this. Thirst should be alleviated by saline draughts. In case local pain is complained of in the head, region of the stomach, &c., the application of leeches or sinapisms to the part affected, may prove serviceable; but

here, as in every form of the disease, the state of the bowels should command the greatest share of our attention, and every exertion should be made to restore their natural secretions and the bilious discharges. To effect this, the most useful remedies, perhaps, are small doses of calomel with capsicum, given twice or thrice during the day, and followed by an occasional dose of castor oil, or other purgative. Unless there is a morbid purging or vomiting during the transition, which is not commonly the case, opium should not be administered, even in small doses.

When the fever is fairly set in, the patient no longer presents the heavy, marble appearance, which he had in the transition. He has succeeded in resisting and in throwing off the internal cause of oppression which had nearly crushed the vital powers. The symptoms of reaction are now complete—the skin has recovered its temperature—the pulse its proper volume—the blood its fluidity and colour—and evidence of febrile excitement in the system is soon developed.

Although the general symptoms of chronic cholera bear a resemblance to those of common fever, the treatment will be somewhat different. Venesection is scarcely ever productive of any benefit, and, as it may destroy the patient, its use

should be avoided. It is still the primary object of the physician to endeavour to restore the secretions of the bowels, and the bilious discharges. Before the evacuations assume their bilious qualities and healthy consistence, the safety of the patient is not secured. Considerable delay in these changes taking place is always a bad omen. To facilitate them, small doses of calomel, with capsicum, may be tried and repeated a few times,* and purgatives occasionally. As in common fever, local symptoms, when they arise, will require their appropriate treatment—as leeches, blisters, &c. to the head and epigastrium, for pain in these regions. Irritability of stomach or bowels, also, may require their application. Early in the consecutive fever, spirituous stimulants are inadmissible, but towards its decline, if there is much debility, diluted brandy or wine may be given with advantage. On the whole, the success of the remedial agents will depend, in a great measure, upon the medical judgment of the practitioner who directs them.

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* The calomel is not administered, in any period of cholera, with the intention of exciting salivation. After a few doses in the twenty-four hours, I have been accustomed to give some purgative medicine, and then to allow a day or so to intervene before repeating the calomel, in case its use was again proper.

CASES OF RECOVERY*

Illustrative of the Premonitory Symptoms, without Purging or Vomiting.

Mrs. Dobson, aged forty. Yesterday she visited a cholera patient (since dead) who lived next door, and eight hours afterwards was seized with giddiness and sensation of pricking, like that of pins, in right foot and right hand. Had the pricking in a less degree in left foot, but left hand was not affected. Complains of flatulent eructations, of feeling of spasm in stomach, and of general weakness. Eyes seem slightly sunken, and surrounded by a dark areola. Skin and pulse natural. Urine free.

To be bled to ten ounces. To have the compound emetic, and after its operation, a bolus. Limbs to be rubbed with heated flannels.

Second Report.

Treatment was carried into effect. She has had a copious perspiration since. Symptoms greatly abated.

Remarks.

Recovery was completed by the use of an occasional purgative.

Anne Dobson, aged thirty-five. Is sister-in-law to the preceding patient, and was engaged in rubbing her

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* In selecting the following Cases, from a very numerous collection which I made at the bed-sides of the patients, it has been my object to exhibit the various symptoms attendant upon cholera, and the different degrees of intensity in which they may be found in the respective periods of the disease.

with heated flannels. Having performed that service, she returned home, and in an hour after her return she was seized, while in bed, with cramps in her feet and legs, which drew her legs forcibly upwards, and wakened her from sleep. Had thirst, giddiness, and noise in ears.

She was bled an hour after symptoms commenced, and had a purgative powder.

Second Report.

Has had no cramps since blood-letting, but giddiness remains, and some uneasiness in abdomen. Bowels not moved.

To have an ounce of castor oil, with fifteen drops of laudanum.

Dorothea Davison, aged nineteen. Two days ago, was in a house where a cholera corpse was lying, and in a few hours after her return home, she was seized with nausea, feeling of numbness and pricking in left hand and arm, and subsequently in left leg.

To have an emetic, and after its action is over, a bolus. Bolus to be followed, in two hours, by a dose of castor oil.

Robert Bateman, aged sixteen. Yesterday he was seized with twisting pain in stomach, giddiness, headach, and dimness of sight. Those symptoms continued, and at ten o'clock, P. M. he suddenly lost the power of his legs. They felt cold, as far up as knees, and were the seat of numbness and pricking. Was bled, at this time, with instant relief of giddiness, and the other symptoms have been since subsiding. Complains still, however, of headach.

Six leeches to be applied to his temples. A bolus to be administered immediately, and, in two hours, a dose of castor oil.

Second Report.

Has had six watery evacuations. Pains in head and abdomen gone. Vision perfect, and power has returned to limbs. Pulse is natural. Tongue florid. He complains only of general weakness.

To take a purgative occasionally.

Joseph Carr, aged seventeen. Two days ago was seized with twisting pain in stomach, and it has continued to recur at intervals. Now complains of giddiness, starting sensations in muscles of legs, and stinging pains in the calves. Is restless, and appears considerably oppressed. Eyes look heavy, and countenance is languid. Bowels are regular, skin warm; pulse 90, firm.

To be bled to fifteen ounces. To have an emetic, and afterwards a bolus.

Remarks.

The restlessness and oppression in this case were constitutional symptoms that required to be soon checked, and therefore free blood-letting was prescribed. Recovery was completed by the use of an occasional purgative.

Francis Thompson, aged twenty. Has had, occasionally, during last fourteen days, cramps in lower extremities, ascending from soles of feet to legs and thighs. These symptoms were relieved temporarily by friction. Two days ago, he lost the power partially of left side, from shoulder to foot, and he did not regain it for fifteen minutes. Has had, during three days, attacks of twisting pain in stomach. No vomiting or purging.

Immediately before affection commenced, he had been visiting a woman who was just convalescent of cholera.

To be bled to fourteen ounces. To have the compound emetic, and afterwards a bolus.

William Fauldon, aged forty-seven. During the period of fourteen days, has had a sensation of numbness and pricking in anterior half of both feet, and more particularly in toes. Legs have been quite free of these sensations. Hands and fore-arms have been affected in a similar manner as toes. Complaint is worst at night. During the day, indeed, it gives him little trouble. Throughout the two nights which preceded yesterday, it was so severe in hands and fore-arms, that he could not close his eyes in sleep. Pulse and skin are natural; bowels somewhat costive.

To have the compound emetic, and afterwards a bolus, and a dose of castor oil.

Second Report.

Symptoms considerably relieved. Slept well.

To have four alterative powders, one every third hour. To take a purgative occasionally.

CASES

Illustrative of the Premonitory Symptoms, with Purging.

Elizabeth Davison, aged sixty. Her son-in-law is ill of cholera in the house in which she lives; she has had the rice-water diarrhœa during seven days, with numbness and pricking in lower extremities, and particularly in right thigh.

To have four alterative powders, one every third hour, and afterwards a dose of castor oil.

Robert Richardson, aged twenty-six. During last three days, has had the rice-water diarrhœa, accompanied with distressing flatulence, but without griping or other pain.

A blister to be applied to abdomen. To take an emetic, and afterwards a bolus.

Thomas Day, aged seventeen. During a week, he has suffered from diarrhœa, giddiness, numbness, and pricking in legs. This morning, legs were nearly in a paralytic state. Has slight pricking in fingers. Pulse 80, skin warm, tongue florid, smooth, and glossy.

To be bled to twelve ounces. To have an emetic, and afterwards a bolus.

Second Report.

Symptoms greatly abated.

To have an occasional purgative of calomel and jalap.

James Hodgin, aged twenty-three, lives in the same house with his brother, who is ill of cholera. This morning, when at work in the coal-pit, was seized with purging and twisting pain in his bowels. These symptoms were followed by nausea, retching, and flatulence, and hœmorrhage from nose. Took a dose of mustard as an emetic, but it did not operate.

To be bled to fourteen ounces. To have a bolus, and afterwards an ounce of castor oil.

Remarks.

This patient had a few of the alterative powders and an occasional purgative before recovery was completed.

Oswald Potts, aged thirty-five. His brother died some days ago of cholera, and he had visited him. This morning, between four and five o'clock, was seized with the rice-water diarrhœa. Has giddiness, numbness in left leg and foot, and pains in the hollow of foot. Seems somewhat oppressed.

To have the compound emetic, and afterwards a bolus.

Anne Bell, aged fifty-six. Has been subject during thirteen days to shooting pains in calves of legs, and in fleshy parts of arms. Last night, numbness and pricking began in hands and feet, and cramps in a short time after. About eleven o'clock purging was added to the other symptoms, and she had several dejections since, which are slightly bilious. Has giddiness, but no nausea or vomiting. Skin and pulse natural.

To be bled to twelve ounces. To have an emetic, and afterwards a bolus.

Mary Rippon, aged eighteen. Last night was seized with pains in bowels and diarrhœa. Had a sensation of numbness in legs, and she felt unable to walk from loss of power in limbs. Motion of tongue was also impaired, and she could articulate with difficulty. During the day was in the house where the corpse of Ferry, a cholera patient, was lying. After coming out, she complained of the bad smell, and had nausea. About ten o'clock, P.M. she received medical advice. Blood-letting was performed, and an emetic was administered.

Now complains only of general weakness and feeling of oppression, and throbbing in the cardiac region.

To have four alterative powders, one every third hour, and, afterwards, a purgative occasionally.

John Cowie, aged forty. Five days ago, while working in the coal-pit, was seized with giddiness and cramps in the muscles of right side of lower jaw. To these were added numbness in limbs, nausea, and the rice-water diarrhœa. Was bled and had some internal medicine, with instant relief of symptoms. Dejections, however, are still liquid, though dark coloured, as if from vitiated bile.

To have the alterative powders, *m. s.*, and an occasional purgative.

Francis Graham, aged seventeen. Four days ago, was seized with cramps in muscles of left side of lower jaw. Pains commenced soon afterwards in stomach and bowels. He took at this time a dose of common salts, and it was followed by the rice-water diarrhœa. Was bled yesterday, and had a bolus, which checked the purging and relieved the other symptoms. During last night experienced cramp in flexor muscles of great toe of left foot.

To have the alterative powders, *m. s.*, and an occasional purgative of jalap.

Anne Chipchase, aged fifty. Has had the rice-water diarrhœa occasionally during last fifteen days, and two days ago, while in bed, cramps began in feet, and soon after in hands. Had nausea and slight vomiting. Was bled last night and had a bolus, with considerable relief. During the night, she had only one dejection, and that was slimy.

To have the alterative powders, *m. s.*, and an occasional dose of castor oil.

Mark Anderson, aged thirty-eight. He works in a coal-pit, and the cholera prevails in the neighbourhood

of his residence. Last night, about ten o'clock, he was seized with the rice-water diarrhœa, without pain. Went to his work at one o'clock, A. M., and while pursuing his occupation in the pit, which he does completely naked, he had in the course of a few hours, nine evacuations. Diarrhœa has continued since his return home this morning.

To be bled to sixteen ounces, and to have a purgative of calomel and jalap occasionally.

Second Report.

Purging much abated; but there is no bile in the discharge.

To remain in bed. To take a grain of opium at night, and to continue the purgative occasionally.

Recovery was rapid.

Remarks.

Anderson, like most of the "hewers" of coal who were attacked, was a powerful muscular man, and previous to his seizure, in robust health. As the hewers were accustomed to work in a state of nudity, and were adjacent to the currents of ventilating air that supply the interior of the coal-pits, they would frequently be predisposed to the formation of cholera. The temperature of the pits, moreover, being higher than that of the external air, a change from one to the other, in this, the winter period of the year, would favour the operation of the morbific miasm, when the persons who had recently undergone this change happened to approach it. A third predisposing cause consisted in the exposure to cold which the pit-men incurred in their own houses. After returning from their employment, I usually found them stripped naked, and engaged in washing the coal-dust off their bodies, over the whole surface of which it formed a thick coating.

CASES*

Illustrative of the First Stage of Acute Cholera, with its Medical Treatment.

William Richardson, aged twenty. Lives next door to a cholera patient. Has had the rice-water diarrhœa during four days. Last night, (January 16th,) was seized with severe twisting pain in stomach and bowels, and almost constant vomiting, which kept him from sleeping throughout the night. Pulse firm, and somewhat accelerated. Skin warm. Has passed very little urine.

To be bled to sixteen ounces. Dry heat to be applied. To have an emetic, and afterwards a bolus.

18th.—Treatment was carried into effect. Has had no vomiting since. Pains in abdomen gone. Has had only three dejections, but they are still watery, and destitute of bile. Quantity of urine increased. Had some cramp yesterday, in the sole of right foot; it soon subsided, however, and did not return. Pulse 80, full and soft, skin warm, tongue very florid and moist; slept well.

To have four alterative powders, one every third hour, and after their use, a dose of castor oil occasionally.

Recovered, with slight febrile symptoms.

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* The subjoined cases afford examples of the various states in which the temperature of the skin is found in the earlier stage of acute cholera. In the first set of cases, the temperature of the skin is of the natural standard; in the second, the temperature is above the natural standard; and in the third, below it; in this, again, the coldness will appear in different degrees of intensity.

Mrs. Louden, aged twenty-nine. Had been recently visiting cholera patients, and on yesterday morning she was seized with the rice-water diarrhœa. In about five minutes subsequent to this, vomiting began. This morning, (Jan. 18th,) about one o'clock, cramps commenced in feet and legs. Complains also of giddiness, and feeling of internal oppression. Pulse small and somewhat quick, skin warm, passes urine.

To be bled to fourteen ounces. To have an emetic and a bolus.

19th.—Treatment was carried into effect. Urine has been since suppressed; but she has had no cramps or vomiting. In the evening had three dejections, thin, and without any bilious tinge. Has tenderness at epigastrium. Tongue florid, chapped, and dry; pulse quick and small. No headach.

To have a blister applied to the epigastrium. To take four of the alterative powders, one every third hour, and afterwards a dose of castor oil.

Mrs. Eldsen, aged sixty-seven. Her brother died recently of cholera, and she had visited him in his illness. Yesterday morning, (January 17th,) was seized, about six o'clock, with pains in bowels, and cramps in feet and legs. Purging began in half an hour afterwards. Suffered at that time from a feeling of internal oppression. Was bled for these symptoms at noon, and they have since been less severe.

To have an emetic and a bolus, *m. s.*

19th.—Symptoms moderate, but diarrhœa still of the rice-water character.

To take an occasional purgative of calomel and jalap.

Mary Bewick, aged fifty-five. Yesterday visited Watson, a cholera patient, who lives at the distance of half-a-mile. Immediately on her return home, she was seized with the rice-water diarrhœa, and during the night vomiting began, and also cramps in legs. Has pain at epigastrium, and distressing flatulence of stomach. Skin warm.

To be bled to ten ounces. A blister to be applied to epigastrium. To take the compound emetic, and afterwards four of the alterative powders, *m. s.* and castor oil.

Under this treatment, the symptoms subsided; she had only slight fever, but was confined to bed a considerable time by the consequent debility, for the removal of which she used medicinal tonics and a little wine.

Anne Hall, aged twenty-one. She is pregnant. Has been in the habit of visiting houses in her neighbourhood in which cholera prevailed, and five days ago she was seized with the rice-water diarrhœa. During last two days purging has been very severe, and attended with occasional vomiting, twisting pains in stomach and bowels, and a feeling of oppression at the region of the heart. The night before last, had cramps in feet and legs, but during yesterday, (Jan. 21st,) they were not felt, and, instead, she has experienced a feeling of pricking in hands and arms, and numbness in right thigh. Pulse 80, full and firm, skin warm, urine suppressed.

To be bled to fourteen ounces. To have a bolus, and afterwards a dose of castor oil.

22nd.—Treatment was carried into effect. Blood has separated into serum and clot, and the latter is without buff. Has had one dejection since yesterday, still watery; but she complains now only of debility, giddiness, and some pain in bowels.

To have an ounce of castor oil, with fifteen drops of laudanum.

Joseph Barker, aged thirty-six. While working in the coal-pit this morning, (January 18th,) was seized with pains in stomach and bowels, and giddiness. Soon afterwards the rice-water diarrhœa began, and nausea and frequent retching. Complains of pains in legs and arms, pricking and coldness in feet, and a general feeling of oppression and weakness. Pulse 84, full and throbbing. Skin rather above the natural temperature. Tongue pale and moist.

To be bled to fourteen ounces. To take an emetic and a bolus.

19th.—Treatment was carried into effect. All the symptoms are reduced except the purging, which continues. Discharge is slimy and mixed with blood.

To take four alterative powders, *m. s.*, and an occasional dose of castor oil.

Ellen Bartley, aged twenty-six. Yesterday visited her brother, who is ill of cholera, and this morning she was seized with the rice-water diarrhœa, cramps in feet, hands and arms. Says there is no power in arms, and she feels "as if they did not belong to her." Has giddiness, nausea, and griping in abdomen. Complains of prostration of strength, and a feeling of weight about the cardiac region, and obstructed respiration. Pulse 90, full and firm. Skin rather above the natural temperature. Tongue pale and moist.

To be bled to fourteen ounces. To have the compound emetic, and a bolus.

Ralph Harrington, aged 14. Yesterday morning was seized with severe vomiting of the rice-water fluid, and in three hours after this, severe purging began. Previous to the purging, had severe twisting pain in bowels, but it subsided with the appearance of the former. Appears to suffer from internal oppression. Pulse is firm. Skin is rather above the natural temperature.

To be bled to twelve ounces. To have the alterative powders, *m. s.*, and an occasional dose of castor oil.

John Richardson, aged twenty-nine. Has been subject during several days to nausea, and to flatulence in bowels. About four o'clock this morning (January 14th), was seized with the rice-water diarrhœa. Fluid passed almost involuntarily, and without griping or other pain. Now, twelve o'clock, vomiting has just commenced, and he complains of great internal oppression, giddiness, and general weakness. Features haggard, pulse distinct but small, skin rather below the natural temperature, urine suppressed.

To be bled to sixteen ounces, and to have dry heat applied to surface of body. After blood-letting, to have a dose of the mustard emetic, which, if it should not operate, is to be repeated every ten minutes, until free vomiting is induced. As soon as the artificial vomiting has subsided, to have a bolus.

15th.—Blood was obtained. The emetic vomited freely. Bolus was rejected by the stomach, but symptoms are diminished, and he appears much improved. Pulse full and firm, skin warm, and he has had a free perspiration. Passed about a table-spoonful of urine.

Subsequent to this date he had an occasional dose of castor oil, and he recovered rapidly. The consecutive fever was very slight.

Jane Denning, aged fifty. Last night, soon after visiting a cholera patient, was seized with diarrhœa, and during the night had rigors, pricking, numbness, and cramps in legs, and some vomiting. Vomiting and purging have been severe since morning. The exertion of vomiting appears to produce swelling of face. There is considerable oppression. She moans frequently, and complains of giddiness and debility. Pulse somewhat quick, and somewhat diminished in volume; tongue pale and moist, heat of skin rather below the natural temperature.

To be bled to fourteen ounces. To have dry heat applied. To take a bolus and a dose of castor oil.

Mrs. Young, aged fifty. Her husband died five days ago of cholera. She has had the rice-water diarrhœa for some days. Yesterday was seized with vomiting, cramps in legs, pains in stomach and bowels, giddiness and headach. Evacuations are almost incessant, and she feels so weak that she is unable to sit up. Pulse somewhat quick and small, skin rather below the natural temperature.

To be bled to twelve ounces. Dry heat to be applied. To take four of the alterative powders, *m. s.*, and an occasional dose of castor oil.

Mary Weir, aged twenty-four.—Is four months pregnant; yesterday, at noon, was seized with the rice-water diarrhœa and twisting pain in the bowels. In the evening, cramps and feeling of numbness began in legs, and they soon became very cold. Has nausea and frequent vomiting, and feels faint when she attempts to sit up in bed. Her eyes seem a little sunken, and are surrounded by a

dark areola. Pulse is somewhat small and accelerated, skin chilly, tongue pale and moist.

To be bled to twelve ounces. Dry heat to be applied. To have four of the alterative powders, *m. s.*, and an occasional dose of castor oil.

Launcelot Richardson, aged eleven. Last Monday, as his brother was lying ill at home of cholera, he was sent to the country to his uncle's house, to reside. Had then the rice-water diarrhœa in a slight degree, but it soon subsided, without giving much trouble. During yesterday, Friday, he returned home to inquire how his brother was, and found that he was dead. He had been at home only seven or eight hours, when the purging returned with increased violence, and this morning, about eight o'clock, vomiting and cramps commenced. Pulse 80, small, features shrunk, skin chilly. Has recently vomited two round worms, one ten, the other six inches long.

To be bled to eight ounces, dry heat to be applied. To have the compound emetic, and afterwards a bolus and castor oil.

Treatment was carried into effect, and he recovered in a few days. Had an occasional dose of calomel and jalap.

Sarah Salkeld, aged twenty-nine. Four days ago, was seized with the rice-water diarrhœa. Three days ago, vomiting began. Was then bled to eight ounces. Bloodletting removed symptoms; but yesterday morning (Tuesday, Jan. 26th), thinking herself quite well, she attempted to leave her bed, and immediately on rising she fainted, and was obliged to return to it. About eight o'clock, P. M. diarrhœa and vomiting recommenced, and she soon experienced for the first time, cramps in her legs. Complains now also of giddiness, and of great debility.

Pulse is small and weak, heat of skin rather below the natural temperature, tongue pale and moist, no appetite. Urine suppressed.

To be bled to ten ounces. To have dry heat applied. To take four alterative powders, one every third hour, *m.s.*, and to have a dose of castor oil.

27th.—Treatment was carried into effect. Acute symptoms are gone. Is now in the fever. Complains chiefly of weakness. No bile as yet apparent in dejections.

Recovered after the use of an occasional purgative of calomel and jalap.

Remarks.

The relapse in this case is to be ascribed to the incautious conduct of the patient. Persons convalescent of cholera are very susceptible of relapse in case they become exposed to irregularities of diet, cold, fatigue, &c.

John Cook, aged seventy. His son is lying ill of cholera in the same house, and in the next apartment to himself. During five years, he has had an abdominal complaint, which is attended, at times, with purging and vomiting. Had been perfectly free of these attacks during last month, but this morning (January 27th) he was suddenly seized with diarrhœa. His wife says the discharge is unlike any that he ever passed before, in his habitual attacks. It is of the rice-water character, and he has been vomiting during last hour, a fluid of a similar description. Purging was preceded by nausea, pains in stomach and bowels, flatulence and giddiness. Complains of numbness, pricking, and partial loss of power in legs. There is a brown areola slightly apparent around eyes.

Pulse 72, soft and pretty full, heat of skin is rather below the natural temperature. Has voided no urine since attack commenced.

To be bled to ten ounces. To have dry heat applied. To take a bolus and a dose of castor oil.

30th.—Treatment was carried into effect. Now complains only of general weakness, and some pricking in limbs. Dejections are bilious, though thin. Urine has returned.

To take three of the alterative powders, *m. s.*, and afterwards a dose of castor oil.

Remarks.

This case shews the value of blood-letting, even in the old and infirm. In the first stage, the operation should never be omitted on account of age or weakness. The question for the consideration of the practitioner is the quantity of blood to be drawn.

William Charlton, aged twenty-three. Was in Hetton two days ago, visiting Soulsby, who was then ill of chronic cholera. About nine o'clock last night was seized with the diarrhœa, which was preceded by giddiness for the space of two hours. Had distressing nausea all night, and twisting pains in abdomen, and feeling of flatulence. This morning had cramps in the soles of both feet. Pulse was then small and somewhat accelerated, and the heat of skin was rather below the natural temperature. Was bled at ten o'clock, A. M. to twelve ounces, and in half an hour after, he used the compound emetic, which produced copious vomiting.

It is now two o'clock, and he has had only one dejection since treatment was adopted. Pulse small but not quick, skin warm, tongue whitish.

To take four alterative powders, *m. s.*, and an occasional purgative of jalap.

Peter Shearlock, aged thirty-four. Three days ago, soon after he had been at the funeral of a cholera patient, he was seized with giddiness, twisting pain in stomach and bowels, and the rice-water diarrhœa. Evacuations were copious and frequent, amounting to fourteen the first night. They presented the rice-water appearance during the first twenty-four hours; but subsequent to this they contained a considerable proportion of blood. Pulse was then small and quick, and heat of skin rather below the natural temperature. He received medical advice for these symptoms, and blood was drawn from his arm, and an emetic and bolus were prescribed. Under this treatment the majority of the symptoms subsided. He still suffered, however, from frequent purging, and discharge still contained a large proportion of blood. Judging from the clot in the alvine evacuation, the quantity passed during yesterday must have exceeded a pint. Had some cramps in toes during yesterday.

To-day purging has been less frequent, and dejections have for the first time a bilious appearance, but they are still mixed with blood. Has tenesmus, and left side of hypogastric region is tender to pressure. Pulse 80, and improving in strength; blood taken from arm contains serum, and is without buff, skin warm and moist.

To have four of the alterative powders, *m. s.*, afterwards a dose of castor oil.

Remarks.

The case of Shearlock was rendered remarkable by the quantity of blood which was contained in the alvine

discharge; for although intestinal hæmorrhage may be witnessed in some cases of cholera, it is of very rare occurrence.

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* Hannah Elliott, aged twelve years. Her mother is recovering from an attack of cholera, and she has had herself slight diarrhœa for some days, but she concealed it until this morning, (January 23rd,) lest her mother should be alarmed. About five o'clock, A. M., purging of the rice-water fluid became severe. She has had no vomiting or cramps. Has complained, however, of the feeling of great internal oppression common to cholera patients, and the pulse has been gradually losing its power, and the surface of the body, its temperature.

Now (twelve o'clock, noon), she is far advanced in the first stage of acute cholera. There is much debility and internal oppression, the pulse at the wrist is extremely small, though distinct, the surface of the body is moist, and it feels considerably below the natural temperature, and the skin on the hands and feet is becoming dark coloured. Urine is suppressed.

To be bled to ten ounces. To have dry heat assiduously applied. To take the mustard emetic, and afterwards a bolus.

24th.—Blood flowed with difficulty, and, after opening two veins, only six ounces could be procured. It con-

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* The cases that follow are those in which the symptoms had approached nearly to the termination of the first stage of acute cholera, before medical assistance was obtained. The subjects of them are chiefly young persons. Elderly persons do not so often survive this advanced period of the disease—their constitutions do not appear to possess the same resilient or reactive power, which, with a little medical assistance, often enables the former to resist and remove morbid impressions of the most dangerous character.

tained very little serum. Vomited freely after the mustard. Has been since steadily improving. Is at present in the fever, and the symptoms are favourable. There is no appearance of internal oppression, except in an occasional deep sigh. The pulse is 80, full and soft, the face is flushed, and the eyes somewhat red, but the skin in general is warm (not hot) and moist; the tongue is moist, and covered with a white fur. Has had, to-day, two dejections less thin, and they contain dark bilious matter. Voids urine.

To take two of the alterative powders, *m. s.*, and afterwards a dose of castor oil.

27th.—Improvement has continued, and she is now convalescent.

Remarks.

This patient was the sister of Jane Elliott, whose case was described amongst the deaths at Hetton. Had Hannah been another hour later in obtaining medical assistance, there is every probability that she would have died also. Between the two cases, a most striking resemblance was presented in the progress of the constitutional symptoms, with the exception that Hannah's were permitted to pass into the second stage, before blood-letting was attempted, and it was then too late to procure blood. Both these patients had a symptom which is not common in cholera. They complained of severe pain in the spine, immediately beneath occiput.

Anne M'Cree, aged thirteen. Her sister died of cholera, and was buried three days ago, and the day of the funeral, this patient, who attended it, was seized with the rice-water diarrhœa. About eight o'clock this morning, (January 27th,) vomiting began, and at ten o'clock, P. M.,

cramps commenced in legs. Was then bled to four ounces, with temporary relief, but symptoms soon returned, in an aggravated form.

At present, four o'clock, P. M., she is far advanced in the first stage; features are shrunk, and countenance is marked with anxiety. The pulse is extremely small at the wrist, skin moist and considerably below the natural temperature. Urine suppressed.

To be bled to six ounces. To have dry heat assiduously applied. To take three of the alterative powders, *m. s.*, and afterwards a dose of castor oil.

29th.—Two veins were opened, one in each arm, and six ounces of blood were obtained with difficulty. At first, blood came away in drops, afterwards in a stream. It presents a coagulum of the consistence of jelly, and there is not more than half an ounce of serum on its surface, which is neither cupped nor buffed. Vomiting and purging became moderate soon after the blood-letting, but stomach remained irritable, and rejected the powders as soon as administered. The castor oil, however, was retained. This morning, has vomited only once, and has had only one rice-water dejection—the former at eight, the latter at nine o'clock. Since that she has slept soundly, and heat has been returning to surface of body, and pulse has been improving. As yet, she appears somewhat heavy and unwilling to speak, but when roused says she is better. Has passed urine.

The alterative powders to be tried again; one every third hour, and capsicum to be substituted for the opium.

29th.—Retained the powders. Is still improving, and fever is moderate. Has had three dejections, less thin and now decidedly bilious. No vomiting. Slept well during the night, and desire for food is returning.

John Bennett, aged fourteen. Has been suffering for some time under a severe compound fracture of leg—the granulations were healthy, and the discharge copious, previous to his attack of cholera about to be described. His mother and one of his brothers died recently of cholera, and he was seized himself, three days ago, by the rice-water diarrhœa. Yesterday morning incessant vomiting began, and constitutional symptoms, which have been increasing.

At present the symptoms appear to be near the end of the first stage—the pulse is barely perceptible at the wrist, the skin is cold and clammy, and the blue colour is beginning to mark the hands and feet, the features are shrunk, and a dark areola surrounds the eyes, urine is suppressed, there is great internal oppression. Has had no cramps.

To be bled to eight ounces. To have dry heat assiduously applied. To take the mustard emetic, and afterwards a bolus and castor oil.

18th.—Five or six ounces of thick blood were all that could be obtained. The emetic was administered, and free vomiting followed its use; but he has obstinately refused to take any other medicine. The vomiting and purging of the rice-water fluid, actions that were subsiding as the collapse approached, have again become very frequent. He is unwilling to speak, but when medicine is presented to him, he refuses to take it, and implores the attendants to let him alone. This shews some activity of mind, and that the patient has escaped the torpid and dangerous state which is often seen in the period of transition. He is now, it may be said, fairly in the fever, and the febrile symptoms are severe. The pulse is firm and rapid, and the surface of tongue is covered with a pale fur, its edges are florid, skin hot and dry, thirst urgent, secretion of urine is present.

A blister to be applied to the region of the stomach, and

a bolus to be administered, if he can be prevailed upon to swallow it.

19.—Treatment was carried into effect. Febrile symptoms considerably reduced; no vomiting since blister rose; had two thin dejections, and they have a bilious tinge.

Remarks.

When I first saw Bennett, I had not any expectation that he could recover, taking into account the violent state of the cholera symptoms—and when to this was added the debilitating effect of the compound fracture, it seemed almost too much to expect even a prolonged attack. He became convalescent, however, in about seven days, and he certainly was not much indebted to medicine, for his reluctance to take it could not be overcome by reason or moderate force. Like his brother, who died of the disease, he had not any cramps in his limbs during the whole progress of the attack, which was a fortunate circumstance, as cramps in the fractured leg might have produced very serious results.

William Watson, aged twenty. Lives in the same house and apartment where Turnbull died of cholera. During three days he has had the rice-water diarrhœa.

This morning (January 16th), severe vomiting began, and the symptoms continued to increase. Has some deafness, but no giddiness or pain in stomach or bowels.

At present, the symptoms are near the end of the first stage of acute cholera. The pulse is barely perceptible at the wrist, the skin is cold and moist, the features are shrunk, and blueness is appearing upon the points of the face, and on the hands and feet. The eyes suffused, and surrounded by a dark areola: the voice is husky. There

is much debility and appearance of internal oppression. Urine is suppressed.

To be bled to eight ounces. To have dry heat applied. To take the mustard emetic, and afterwards a bolus and a dose of castor oil.

17th.—Not more than five ounces of thick blood could be procured. Vomited freely after the emetic, and his stomach retained the bolus and castor oil. Reaction came round rapidly during the night. The fever is now nearly established, and the symptoms are severe. His head has still the appearance of considerable internal oppression. He lies in a passive state, with his eyes shut, and he is unwilling to speak or move. Pulse is 90, pretty full and soft, skin hot and dry, face flushed, tongue dry, and covered with a whitish fur, voice husky. Has had three watery dejections, but no vomiting. Owing to the heavy state which he is in, his attendant cannot say whether he has slept or not. Passed some limpid urine this morning.

To take four alterative powders, *m. s.*, in which two grains of capsicum are to be substituted for the opium. In two hours after the use of the last powder, to take a dose of castor oil.

18th.—Head is free of oppression. Fever is still severe. Has had some muttering delirium through the night, but mind seemed correct when he was spoken to, and he slept, though in a disturbed manner. His pulse is 96, full and throbbing.

[redacted].—Tongue and lips are dry, and covered with a brown fur. Thirst is alleviated by small quantities of barley-water. Had two dejections, less thin, and somewhat dark, as if they contained vitiated bile. Makes no complaint.

To take, in the evening, an ounce of castor oil, with twenty drops of laudanum.

19th.—He is willing to speak to-day, and he complains of great debility. Febrile symptoms appear less active. His voice is gaining strength. Thirst is diminished, and dejections, though dark, are less thin. Was restless in the night.

To take a draught at bed-time, containing twenty-five drops of laudanum, and thirty drops of antimonial wine.

20th.—Is greatly improved. Slept well, pulse is moderate, tongue is beginning to clean. Had one dejection, and its appearance was approaching to the natural colour and consistence. Expresses some desire for food.

To be allowed the sparing use of nutritious liquids. In the evening, to take a purgative composed of calomel and jalap.

After this date, although the extreme debility had reduced him to a low nervous state, he continued rapidly to recover. Subsequent to recovery, he had no recollection of what occurred to him while the disease was severe.

Thomas Richardson, aged nine. His father had an attack of cholera about a fortnight ago, and on yesterday, at noon, he was himself seized, while in the coal-pit, with severe diarrhœa. At nine o'clock of this morning, (January 26th,) vomiting began. Complains of giddiness, and twisting pains in bowels. The symptoms are now near the termination of the first stage.—The pulse is ninety, and extremely small at the wrist; the skin is moist, and it feels considerably below the natural temperature; features are anxious, and eyes are surrounded by a dark areola; voice not affected. There is much internal oppression. Has continual attempts at coughing, and the cough is a stomach-cough, as if the cause of the irritation was in the stomach, instead of the wind-pipe. Urine suppressed.

To be bled to eight ounces. To have dry heat applied. To take the mustard emetic, and afterwards a bolus.

27th.—Only six ounces of blood could be obtained. It was somewhat thickened, and contained but a small proportion of serum. The emetic acted, and he took the bolus. Symptoms of reaction began to appear soon after treatment, and he is now in the fever. There is no torpor, but he has had a very restless night. Pulse is 110, and distinct, skin hot and dry, face flushed, tongue moist at edges, and it is covered with a white fur. Moans frequently; vomited several times during the night, and always when he took any drink. Drink is composed of warm tea. Vomiting ceased three hours ago, and it has not since returned. Had only two stools: they retain the rice-water appearance. Complains of pains in head and bowels. Passed some limpid urine this morning, for the first time.

Dry heat to be discontinued. To take three alterative powders, *m. s.*, and afterwards a dose of castor oil. Four leeches to be applied to temples for headach, and in case vomiting returns, to have a mustard plaster applied over the region of the stomach.

28th.—Fever is much diminished; slept pretty well. Had one dejection, less thin, and slightly bilious. Had no vomiting until this morning at nine o'clock; since that he has vomited three times, and he threw up a round worm, ten inches long. Pulse is full, and less quick. Makes no complaint unless of great debility. Has no desire for food.

To take a bolus, and afterwards a dose of castor oil.

Subsequent to this date, he improved rapidly under the use of an occasional purgative.

Remarks.

It often happens, as in this case, that lumbrici are discharged from the stomach or bowels of young patients during their attacks. I attended a boy, William Hutton, aged eight, in whom the symptoms were almost exactly the same as those of Richardson. He had the stomach cough, and previous to his convalescence, he voided twenty-one round worms, of various lengths, from his bowels. The cholera symptoms in Hutton's case were near the termination of the first stage before I saw him. Blood-letting was then attempted, and five ounces of thickened blood were obtained with difficulty; it came away in drops at first, and afterwards in a broken stream. He had the mustard emetic, a bolus, and a dose of castor oil. During the ensuing night the fever set in, and the secretion of urine was restored the next morning. The fever soon became severe, and the dejections, at the end of the fourth day of the attack, presented an appearance as if hard-boiled eggs had been chopped and mixed with a large quantity of water. During the fifth day, they contained bile, and a striking improvement was then observable in the general symptoms.

Joseph Spooner, aged four years and a half. His mother died of cholera on yesterday. In the evening he was seized with nausea, and in the afternoon of to-day, (January 22nd,) vomiting began, and purging soon afterwards. His pulse is now quick, and extremely small at the wrist; the heat of skin was considerably below the natural temperature, but it has been again raised by the application of artificial heat; urine is suppressed. He appears to suffer under great internal oppression, and head is torpid.

To be bled to five ounces. To have a bolus and a dose of castor oil.

23rd.—Three incisions were made at bend of arms, without obtaining any blood. A branch of the temporal artery was then opened, and without effect. The main trunk of the artery, anterior to the ear, was afterwards incised, and about three ounces of blood were at last procured. The blood was thickened, and as dark as that contained in healthy veins. At present, with the exception of some torpor about the head, the fever is completely established. Has had no vomiting since bloodletting; but has had three rice-water dejections. The pulse is rapid, and, though not full, is distinct; skin hot; respiration heavy; voids urine; surface of tongue covered by a thin brown fur.

To take three alterative powders, with capsicum instead of opium, *m. s.*, and in two hours after the last powder, to take a dose of castor oil.

24th.—There is less torpor about the head, but the febrile symptoms are still extremely severe. Pulse rapid and throbbing; skin hot and dry; tongue and lips dry, and encrusted with a brown fur; thirst; eyes suffused. Slept a little during the night. Had two dejections, black and fetid, and less thin.

To take a dose of castor oil.

25th.—Torpor of head gone, but he is unwilling to speak or move. There is less heat of skin, and pulse, though rapid, is calm; febrile symptoms, however, are still of a highly dangerous character. The debility is extreme; the tongue and lips are deeply furred. Was restless during the night; had some muttering delirium, and slept little. Passed one dejection, black and fetid.

To take a bolus and a dose of castor oil.

26th.—Slept soundly, at times, during the night. There

is some improvement in the general symptoms. Had several dark stools.

29th.—Since last report, the improvement has been gradual and steady. Has taken one tea-spoonful of castor oil daily, and on the 27th took two alterative powders, with a quarter of a grain of opium in each. At present the fever is greatly reduced. Debility is the chief complaint. Had two dejections since yesterday, and they contained healthy bile.

February 4th.—Since last report he has had a little castor oil daily, and he has been allowed the sparing use of light nutritious food. Is convalescent.

Remarks.

The severity of the fever in this case, and the delay in the return of the proper alvine discharge, led me, more than once during its progress, to entertain little hope of recovery taking place. In infants, indeed, and very young children, the fully-formed disease is almost always of the most dangerous description. At a comparative early period, in consequence of the smallness of their vessels, it becomes impossible to procure free blood-letting, and, as they have not, in the majority of cases, the assistance of this invaluable remedial agent, such patients generally die either in the transition or in the fever.

Grant Archbold, aged forty-eight. Yesterday morning, (Jan. 24th,) about two o'clock, was seized with the rice-water diarrhœa, and about eleven o'clock last night, severe vomiting began. These symptoms were preceded by coldness and numbness in feet and legs. There is now great debility and internal oppression. The pulse at the wrist is quick and extremely small; the skin is cold; the features are shrunk; eyes are surrounded by a dark areola,

and blueness is appearing on hands and feet; voice is weak and husky; urine is suppressed.

To be bled to twelve ounces. To have dry heat assiduously applied. To take a bolus and castor oil.

26th.—Blood was obtained with difficulty. Had frequent thin dejections during the night; they appear as if mixed with mud. Fever is now established. The pulse is very distinct at the wrist; the skin is warm and dry; the tongue is dry and brown; the voice cannot be raised beyond a whisper. Has passed urine, and has had no vomiting.

To take four of the alterative powders, *m. s.*, and afterwards a dose of castor oil.

27th.—Has been restless during the night. Febrile symptoms are strongly typhoid; the teeth and tongue are dry, and encrusted with a black fur; debility is extreme; he is unwilling to speak or move, and is very despondding; voice still a whisper. Complains only of thirst. Has had two dark stools, less thin.

To take a dose of calomel with jalap; and the jalap is to be repeated, if necessary.

28th.—Slept pretty well during the night, and a change has taken place for the better. The pulse is 90, full and soft; the tongue, though furred, is moist, and thirst has ceased. Has had several dejections, still thin; but now they are distinctly bilious.

To take, towards night, an ounce of castor oil, with twenty-five drops of laudanum.

29th.—Has had one bilious dejection. Continues to improve; pulse 72; but he still labours under very great debility. Voice has not, as yet, regained any power; sighs often, and, like all cholera patients when recovering from violent attacks, he is desponding, and mentally oppressed.

To have half an ounce of port wine, in the form of negus, three times daily.

Subsequent to this date, the daily quantity of wine was gradually increased, and some nutritious food was allowed; in the way of medicine, he had an occasional dose of castor oil. It required several days, however, to restore his voice, and to remove the low nervous state into which he had fallen.

The Consecutive Fever.

The specimens of the chronic cholera, or consecutive fever, in the preceding cases, are such as may be expected to occur after similar states of the acute disease. When the progress of the acute symptoms is checked early in the first stage, the fever is short, and not dangerous; the rice-water soon give place to bilious dejections, of a more or less healthy appearance, and any severe symptoms that exist, subside in a day or two. But when the acute period has been permitted to pass uncontrolled through the second stage, the fever will be violent, and the patient will generally sink in the second or third day of the attack: when the symptoms are mortal, seldom do they survive until the tenth day. One of the most prominent symptoms in the protracted fever, which appears to be a result of the first morbid change in the system, is the derangement of the function of secretion. The removal of this derangement is the common precursor of recovery; whereas its prolongation is as commonly the herald of death. Where the derangement of the secretory function is prolonged, the alvine discharges lose the rice-water character, and put on a more alarming form; they are then opaque, and in the course of a short time they may present a variety of appearances. In the early part of the fever, they have most frequently the

consistence of thin gruel, and appear, in colour, as if mixed with mud; this, again, may become converted into a fluid like coffee grounds, or into a slimy matter, pale, or traversed by black streaks. I have seen the rice-water discharge put on, early in the fever, an appearance as if mixed with coal-dust, and, afterwards, it became of a gruelly consistence, and as if mixed with blackened hay-seeds. The thick gruelly fluid, moreover, may assume a dark green, brown, or black colour, as if from a mixture of vitiated bile. These conditions of the discharge, with the absence of the secretion of urine, are always alarming prognostics, although the patient may have the aspect of a person only suffering under debility. Until the day previous to death, the pulse, though small, may be slow and distinct, or it may be full and soft; the skin, though easily chilled by exposure to the air, may be moderately warm; the appetite returning; the stomach free of vomiting; the bowels moderately open, or unmoved except by medicine; the mind perfectly clear and collected, and yet this state, which leaves the inexperienced practitioner and the patient unsuspicious of danger, will often be changed in a few hours. The pulse comes gradually to lose its strength, and the skin its heat; the mind falls into a low muttering delirium, the hands are affected with nervous twitchings,—the symptoms of approaching death are rapidly developed, and the patient expires in a secondary collapse, the consequence of chronic cholera.

CONCLUDING OBSERVATIONS.

While engaged in the investigation of any disease that is supposed to be propagated by an invisible miasm or subtile fluid emanating from the bodies of the sick, or from marshes, or other sources of malaria, medical men have been at all times desirous to obtain some knowledge of the constitution of the miasm itself, in the hope that such knowledge might explain in what way certain remedies operate in compassing the removal of the disease, or in the hope of discovering a more efficient method of cure than any of those already in use. Their labours in this path, however, have been hitherto abortive. Chemistry, to which modern medicine is so largely indebted, has, in this instance, lent its aid in vain. The science, that can with facility lay hold of the air "through which we live and breathe," and weigh, and divide it into its component elements, has shed no light on the composition of the more subtile and destroying fluid; and even when we feel morally convinced of the presence of the latter in the chambers of the sick, chemistry

has not supplied us with any test, by which its presence may be recognised, or inferred.

Perfectly unacquainted as we are with the elements of the miasms—contagion and malaria—we know perhaps as little of the first morbid effect which they produce within the human body—an effect which has been called the *proximate cause* of the disease, in contradistinction to the miasm, which has received the name of *remote cause*.

Although the nature of the proximate cause, like that of the remote, be unknown, and in the imperfections of our senses may long remain concealed from us, the question of its seat has formed a less fruitless subject of inquiry. Thus, concerning the seat of the proximate cause of cholera, there are among medical men only two opinions deserving of notice. According to one, the miasm of cholera enters the system, and makes its first morbid impression on the nerves; and this impression is the proximate cause which gives rise to the cramps, vomiting, thickening and blackening of the blood, &c. The other would lead us to believe that the miasm enters the circulation, and flowing onwards in the current of the blood, that it tends to impair, and ultimately succeeds in destroying, its organization. The second opinion,

consequently, considers the proximate cause to be a deranged state of the blood, and would ascribe all the external symptoms to its influence.

There is not, however, a shadow of direct evidence furnished by its advocates, to maintain that the blood is the seat of the proximate cause—for as yet no chemical experiment or analysis has uniformly demonstrated the existence of a deranged state of the blood in the cholera cases, *previous* to the appearance of every other symptom; and proof to this effect will be required, before the position can be in reason admitted. It is in a comparatively advanced period of the disease, that the blood has been uniformly found in a morbid condition. After the early symptoms, purging, vomiting, &c. have commenced, and while they are increasing in severity, the serum of the blood, together with the salts which it contains, are gradually expelled from the system, and these ingredients of the healthy circulation may be detected in the fluids discharged from the stomach and bowels. During the second stage of acute cholera, when the collapse is extreme, any blood that may be obtained from the vessels, will form, in attempting coagulation, a loose clot, resembling currant jelly, and apparently either destitute of serum, or nearly so. Dr. O'Shaughnessy has

given the following tabular view of the comparative analysis of the serum in health, in cholera, and in bilious diarrhœa: as he found the structure of the crassamentum quite normal in cholera blood—the globular particles distinct to the microscope—and no membranous shreds perceptible,—the crassamentum is not included in this view.

COMPARATIVE ANALYSIS OF SERUM IN HEALTH, MALIGNANT CHOLERA, AND BILIOUS DIARRHŒA.

INGREDIENTS.	Healthy Standard of Lecanu.	Malignant Cholera. Mrs. Barras.	Bilious Diarrhœa. Mr. Hawthorn's.	Malignant Cholera. Dewar.
	0.	1.	2.	3.
Water	906.00	854.00	921.75	866.80
Albumen	78.00	133.00	61.85	124.00
Urea	0.00	0.40	0.00	0.00
Organic matter, soluble in alcohol and water	1.69	*4.80	*5.20	*4.00
Albumen combined with soda	2.10			
Fatty matter:				
Crystalline	1.20	1.40	1.90	1.23
Oily	1.00			
Muriat. Soda	6.00	4.00	5.00	2.17
Muriat. Potassa				
Carbonate of Soda	..	0.00		
Phosphate of Soda				
Sulphate of Soda	2.10		2.30	0.05
Carb. Lime				
Carb. Magnesia				
Phosph. Lime	0.91	1.60	1.10	0.70
Phosph. Magnesia				
Phosph. Iron				
Loss	1.00	0.60	0.90	1.05
Total	1000.00	1000.00	1000.00	1000.00

* Embrace the organic matter and albumen with soda.

The proportion which the serum of healthy blood bears to the crassamentum, although very variable in amount, may, in Dr. O'Shaughnessy's* opinion, be taken at 43 for the crassamentum, and 57 for the serum; and the specific gravity of the serum at an average of 1.28. In Dewar's case, then, as the proportion of crassamentum was 57, and of serum only 43, a great diminution of the aqueous part of the blood was rendered apparent. In healthy blood, again, the variableness in the proportions of its ingredients is always confined within narrow limits; but in cholera the variableness in the proportions of the aqueous and saline parts of the blood is great, and it may be expected to fluctuate between two extremes. First, where the symptoms are slight and incipient, the blood will be little changed from the proper standard. Secondly, where the symptoms are intense, the blood will appear to be deprived of nearly all its saline and aqueous ingredients.†

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* For our present knowledge of the chemical changes which the blood undergoes in cholera, the profession is chiefly indebted to Dr. O'Shaughnessy.—See a "Report on the Chemical Pathology of the Malignant Cholera:" London, 1832: by W. B. O'Shaughnessy, M. D.; and Papers in the Lancet and Medical Gazette, by the same author.

† We are told in the above Report, that when the acute symptoms attain their maximum of severity, "it will generally

Analysis of the Alvine Dejections.

The alvine dejections characteristic of cholera, when *recent*, are strongly alkaline and inodorous, and composed of a liquid and a flaky or curdy matter. The flaky matter, on analysis, has been found to consist of fibrine and of albumen. The liquid portion contained water, mucus, carbonate, acetate, muriate, phosphate, and sulphate of soda. In Dewar's case, no albumen was observed in the liquid portion, nor traces of caseum or the principles of bile. It should be remarked that the ingredients common to the dejections, like those of the blood, will vary in their proportions at different times, and some of them present at one time, may

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happen that no serum whatever will be separated, and that the chemical examination will relate solely to a dense, clotted, 'tarry' mixture, composed of dense though fluid albumen, fibrine in a semi-coagulated state, colouring matter, and small traces of the usual saline ingredients."

While on this subject, I will express my regret that the analysis of the fluids in cholera has not been extended so as to ascertain the state of the blood immediately at the onset of the symptoms, and during the different periods of their progress, not omitting the chronic period. A progressive analysis, also, of the dejections and of the urine (when present), would be very interesting, and it might furnish, perhaps, better remedial means than are now possessed for the restoration of the suppressed secretions in the consecutive fever.

be absent at another. After the purging has continued for a considerable period, the discharge is said to have occasionally lost its alkaline character, in consequence of all the alkali of the blood having been previously exhausted.

The examinations of the bodies of persons who died of cholera, have failed to explain the nature of the proximate cause; but as far as such evidence goes, it would refer the seat of the primary derangement to the nervous system. If a patient die in the acute period of the disease, during the collapse, no organic change that may be considered as the primary derangement, and the indispensable precursor and source of the symptoms, can be discovered. Death appears to have ensued as an effect of one of the symptoms, the condition of the blood—which, being deprived of nearly all its aqueous and saline constituents, could no longer be circulated along its vessels, or afford to the heart its natural stimulus.

Under these circumstances, the morbid appearances dependent on cholera are few in number and simple in character. Of the external parts of the body, the limbs in many cases are livid, and the feet and hands corrugated. The features that were shrunk and anxious during the progress of the disease, lose these peculiarities in some

measure after death, and placidity mingles in their expression. The venous trunks of the abdomen, of the chest, and of the head, are found full of thickened and blackened blood, and in some cases it extends to the left side of the heart, and partially to the aorta. The gall-bladder is completely full, or it contains a quantity of bile, of a deep yellow or green colour, which renders it probable, though the duct may be pervious after death, that it was spasmodically constricted during life. The stomach and bowels, externally and internally, frequently appear pale, and perfectly natural; at other times, their vessels are in a state of congestion. Their contents are composed of fluids similar to those which form the dejections, and they do not contain any bile or fœcal matter. The serous membranes are unchanged in all the cavities, with the exception, perhaps, of the peritoneum being occasionally somewhat dry. The bladder is generally empty, and firmly contracted. The remaining viscera have nothing remarkable. Unless congestion of the vessels of the brain and spinal marrow, no morbid change has been frequently observed in the nervous system, and even the structure of the glanglionic portion appears normal.

When a patient survives the acute period, and

is destroyed in the consecutive fever, the morbid appearances may differ from the preceding to a greater or less extent, according to the duration of the attack. Those appearances which may be fairly ascribed to the chronic cholera, are generally congestion, inflammation, or disorganization of the mucous membranes of the stomach and bowels. The contents of the intestines consist of the muddy, the black, the green, or the slimy matters which form the dejections of this period. The deranged state of the function of secretion, however, seems to be the efficient cause of death. As a casual effect of chronic cholera, inflammation may have existed in the lungs, head, &c.; but in my experience, this has been very infrequent, much more so, indeed, than in ordinary fever.

Now, having described the results of the chemical and anatomical investigations, I shall speak of the medical treatment of cholera which has been founded upon them.

The character of the second stage of acute cholera, as was previously remarked, is extremely dangerous and intractable, and the medicines that prove serviceable in the earlier periods of the disease, are, during the collapse, of little or no avail. Looking to this fact, and perceiving that the immediate cause of death, when it takes place

in the collapse, is referred, by the evidence obtained in dissection and analysis, to the state of the blood, some professional men were led to suggest a trial of saline injections into the veins, in order to restore the salts and its serous consistence.

The advantages that were expected to arise from the injection of saline solutions into the veins, were enhanced by some recent observations which had been made on the properties of the blood, in health and in disease. Dr. Steevens had endeavoured to prove, in opposition to received opinions, that all acids blacken the blood, and that oxygen of itself had not the power of imparting the vermilion colour. It exerted, he said, a tractile influence within the air-cells of the lungs, which drew out the carbonic acid, one of the blackening principles, but before the blood could completely recover the bright arterial tint, the presence of *a salt* was absolutely necessary. Or, in his own words:—

* "When we cut out a piece of the red crassamentum from healthy blood which has just coagulated, and immerse this in distilled water, the water rapidly attracts the saline ingredients out of

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* Observations on the Healthy and Diseased Properties of the Blood, by William Steevens, M. D. London, 1832.

the clot. In proportion as this takes place, the colour changes, and in a short period it becomes perfectly black. From this we may infer that black is the *natural colour* of *the colouring matter*, for it is red only so long as it remains in immediate contact with a saline fluid. When we take this black clot out of the distilled water, and expose it directly to the air, it remains black; or if we immerse it in a jar of pure oxygen, the oxygen can now no more redden its colour, than it can change the colour of the blackest ink. There is one way alone by which the red colour can be restored, and that is neither by air, iron, nor oxygen, but by restoring to the blood the saline matter which it has lost; and when we sprinkle or rub a small quantity of the muriate or the carbonate of soda, or any of the neutral salts, on the black clot, not the red merely, but a colour that is highly arterial, is immediately produced. Or when we make an artificial serum by impregnating water with any of the neutral salts, and then take the black clot out of the clean, *fresh* water, and immerse it in this equally clear saline fluid, it is immediately changed from black to a bright red colour. Now, as these experiments prove that when the saline matter is withdrawn from the blood, it becomes black, and when this

is restored, it recovers its arterial colour, we may, I believe, safely infer that the saline matter of the vital current is the true cause of the red colour of the colouring matter, and of course of the red colour of the blood.

" The fibrine, the albumen, &c.," Dr. Steevens also observes, " are naturally solid, and, with the exception of the colouring matter, the whole of the solid ingredients of the blood, owe their fluidity to the *saline fluid* which is contained in the circulation. If an acid be added to the drawn blood, it will interfere with the agency of the saline matter, and the whole of the ingredients become solid, for in this case, even the albumen coagulates, and then there is no separation."

As the serum, or saline and aqueous portion of the blood, is considered to have such powers, we need not be surprised that its nearly total expulsion from the vessels of cholera patients should frequently be the immediate cause of death, independently of the sluggish state of the circulation, which is a mechanical effect of the thickening of the blood. In some cases of cholera, indeed, complete collapse and death ensue some time before the thickening has attained its maximum, characterised by the epithet " tarry,"—and while the large veins of the limbs would yield a large

quantity of the sanguineous fluid on pressure being applied along their course.

Analysis has shewn that the crassamentum retains its healthy structure, even in the "tarry" form, and that scarcely any thing is wanting to restore the cholera blood to its natural state but the water and saline ingredients which composed the serum, and which were carried out of the body in the alvine discharges. To restore these deficiencies, then, has been the object of experiment, and for that purpose an artificial serum was composed and injected into the veins of patients labouring under severe symptoms of cholera.

Dr. Latta, of Leith, appears to have been the first medical practitioner in this country to try the saline injections. Having found,* says Dr. Latta, that the administration of saline fluids by the mouth and bowels either produced no permanent benefit, or apparently aggravated the tormina, vomiting and purging, he at length resolved to throw the fluid immediately into the circulation. The first subject of experiment was an aged female, on whom all the usual remedies had been fully tried, without producing any favourable

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* Lancet, June 2nd, 1832.

symptom, the disease, uninterrupted, holding steadily on its course.

The point of a tube was cautiously inserted in the basilic vein of this patient, and ounce after ounce of the injection was continuously thrown into the system. For some time no visible change was apparent: at last, however, she began to breathe less laboriously; the pulse, that had long ceased, returned to the wrist, quick and small at its commencement, but gradually becoming more distinct, fuller, slower, and firmer. The sharpened features and sunken eyes soon assumed their natural aspect under the reviving animation; and in the short space of half an hour, after six pints of the saline fluid had been injected, she expressed, in a firm voice, that she was free from all uneasiness. She was now actually jocular, and fancied that she needed only a little sleep to complete her recovery. The limbs were warm, and every feature had the expression of comfort and health.

As this was Dr. Latta's first case, he thought all immediate danger over, and the patient was therefore committed to the charge of the hospital surgeon, while the Doctor retired, to relieve himself of fatigue. He had not, however, been long gone, when the vomiting and purging recurred. These symptoms were followed by debility and

collapse, in its former violence, and the patient expired in five hours and a half after the period of his departure. This woman had a sound constitution, and, in his remarks upon the case, Dr. Latta thinks that the injection should have been repeated.

Here we have a very striking example of both the good and the bad effects that may be expected to ensue after saline injections. Almost immediately with their introduction, reaction commences, and the symptoms of the collapse are quickly dissipated. All the signs of reaction, however, are not of a favourable character; the vomiting and purging that had completely or partially subsided during the advance of the collapse, return again as animation returns, and these actions may expel from the circulation the whole of the artificial serum with nearly the same rapidity as it was injected.

To preserve the patient from falling a second time into the cold, blue, and pulseless condition of the collapse, it has been the practice to repeat the injection immediately on the approach of the sinking symptoms, and to endeavour to counteract the tendency to purging and vomiting, by an astringent admixture. On the composition of the injection, and the manner of its introduction into

the veins, at Edinburgh and Leith, Dr. Christison observes—

"The mixture used is different in Leith and Edinburgh. In Leith, the quantity of saline matter employed has not been so large as in Edinburgh, where the mixture in use consists of one hundred and twenty grains of common salt, and forty grains of carbonate of soda, dissolved in five pounds of water. Of this from five to six pounds are injected into a vein in the arm in the course of thirty minutes; and ten pounds are frequently injected at this rate without stopping. The temperature is about 110°, or as high as 115° Fahrenheit, when rigor is apt to be induced. Rigor indeed is apt to follow in all circumstances, but it is prolonged when the fluid is much under 110°. The injection is sometimes repeated twice, or oftener, in one day: in two days forty pounds have been injected.

"The dangers to be anticipated from this mode of treatment, are, so far as I see, three. Air may be introduced into the veins with the injected matter. This is a material difficulty, which must be guarded against by careful attention on the part of the operator. The vein, roughly handled by the introduction of the tube, and its maintenance in that position for some considerable time,

may inflame. This may be justly considered a formidable risk; in point of fact, the vein has inflamed more or less in several cases—I do not remember exactly in how many—but in none has the inflammation been fatal, or very serious.

" I can scarcely doubt, however, if the operation were practised in many instances, and a considerable proportion of individuals to live long enough for the inflammation to run its usual course, we should find some deaths imputable to this cause—probably not a material number.

" The introduction of so much saline matter into the blood, although the salts are the salts of the blood, may be eventually followed by some constitutional injury, which cannot at present be anticipated. This objection is conjectural, reasonable certainly, yet not borne out by observations hitherto made.

" The instrument used is Read's patent syringe, with a fine tube for the vein fitted to it. Severe vomiting often follows, against which the best preventive hitherto, appears to be ten or fifteen drops (in each injection of seven or ten pounds) of a solution of muriate of morphia, one part of the muriate to twenty-five of water. In the saline mixture, some have occasionally added a little white of egg, on the supposition that the albumen

is defective in the blood; but it has not been found useful, and, in point of fact, if I may trust my own experiments, the albumen of the blood is not defective at all, or, at least, immaterially. A fair trial has been made of warm water without the salts, but the immediate effect was obviously less marked, and much less lasting. Along with the saline injections, means are used for warming the body by tin mattresses, into which steam is conveyed. No other treatment of material consequence is combined, except merely to palliate symptoms as they occur. Blood-letting is not practised; opium, if given at all, is administered only in small doses, to check vomiting or purging. The spasms cease immediately the injection is begun." *

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* Dr. Christison's letter, of which the above is an extract, appeared in the *Medical Gazette*, July 7th, 1832; and the results of injection cannot perhaps be better described than by making an additional extract; and, also, an extract from a paper in the same number of the journal, by Dr. Laurie of Glasgow. The experience of one is in favour of injections—that of the other is against.

Dr. Christison observes—" The last authorised account I have had an opportunity of hearing, is to the following effect:—In Leith, nineteen had been treated, and five of these were considered in a fair way. In Edinburgh, eighteen had been treated, and seven were either well, or considered safe;

Every new plan of treatment that has been suggested with regard to cholera, however worthless it may have eventually proved to be, has usually

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several more were alive, but in a very doubtful state; and in every instance, without exception, where the treatment failed, there was found after death such extensive old organic disease of the visceral organs, especially of the liver and kidneys, as would in all probability have rendered a similar event inevitable in the instance of any other severe disease—such, for example, as fever.

"No other remedy has any thing like the *immediate* effect of the injection of the saline solution into the veins. An individual who lies pulseless, almost speechless, deadly cold and shrivelled, will, in thirty or forty minutes, present a good pulse, a general warm respiration, a full florid cheek, and an open lively eye." . . . . "Several individuals who have been brought thus far round, have either died of the subsequent stages of reaction, or have fallen again into the state of collapse, and, after repeatedly doing so, have at length died in that stage. At present, then, you will remark, I speak of its *immediate* effects, which are undoubted, and most striking."

Dr. Laurie observes—"Following the directions of Dr. Latta, I injected from 70 to 150 ounces within a few hours, and *all* my patients, to the number of six, died. It is unnecessary for me to give you the details of these cases; in all of them temporary benefit was produced, but in several the fatal result seemed accelerated. I then tried, in one case, the addition of albumen to the saline solution; in another, the serum of bullock's blood; in a third, human serum; in a fourth, the transfusion of blood; in two cases, small quantities of

received for a time unlimited confidence, and it was to be expected that the saline treatment would not furnish an exception to this. Yet in

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whisky; in other two, a few drops of laudanum; and still *all* died. I began to suspect that the quantities injected were by far too great, notwithstanding the flattering statements which were published, and I resolved to limit the amount to thirty ounces at a time, to throw it in very slowly, and to watch carefully the state of the head and the respiration. Under these precautions four have recovered; but so many have died in despite of all precautions, so evidently injured by the practice, that I have now almost entirely laid it aside, as not only useless, but frequently hazardous. I have injected twenty-six cases—twenty-two of whom have died! Does any plan of treatment merit the name of a cure, under which nearly six out of seven perish?

"The previous cases and dissections afford some idea of what has been done by injections in Glasgow, and the results have led me almost entirely to abandon the practice. I have done so with the utmost regret and reluctance. I was strongly attached to the remedy in theory; and when I say that I persevered, although my eight first cases died, I fear I expose myself to an accusation of obstinate rashness. Some of my medical friends were present at the injections, and I have been most ably and assiduously assisted in almost all of them by my zealous and talented friend, Dr. A. Buchanan; but he (and, I believe, all who have witnessed the operation here) is quite satisfied that saline injections will not cure cholera. My experience would lead me to draw the following conclusions:—

"1st. As to the quantity injected. Is it safe to inject pounds

the last instance, there was infinitely more room for sanguine anticipations than in any, or all, of the exploded discoveries. The surprising change

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at a time? In my practice, every case in which upwards of thirty ounces were thrown in at one time, died—some of them with manifest congestion of the head and lungs. Case 377 died from violent spasms of the chest, and in Case 450 the pupils became suddenly enormously dilated. What, it may be asked, becomes of the fluids in those cases in which congestion does not follow? It runs off by the stomach and bowels. In case 319, I injected 230 ounces without removing the tube from the veins. During the operation the patient vomited profusely. Her own words were, 'As fast as you put in water by my veins, it runs *out* by my stomach.' I am sure she was correct. In many other cases, acute pain was complained of at the epigastrium. Now, if cholera consists of an affection of the mucous membrane of the stomach and bowels, by which the blood is drained of its fluid portions, what good can accrue from feeding the disease, and literally washing the capillaries with salt and water? If benefit be to result from injections, the pulse rises so quickly that I cannot help concluding that it acts as a plain stimulus; and if we throw in too much, we either kill our patient by producing congestion, or feed the disease by overloading the blood-vessels.

"2ndly. When do we know that enough has been thrown in? If I were to continue the practice, I would cease injecting whenever the pulse was steadily improved, whenever the patient fell asleep; whether the pulse were improved or not, whenever the respiration was much hurried, and whenever acute pain was felt in the abdomen. In the first instance,

wrought by the saline injections in the state of the patient in cholera—the sudden transition which he underwent, from the deepest collapse to the ap-

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because injection had done all that it can do; and in the others, because it had began to do harm.

"3rdly. What cases are most favourable for injection? It appears to me, that injection will only do good after the violence of the disease has expended itself, the greater part of the discharges having taken place, and before permanent sinking or reaction are established. If fluid is thrown into the circulation of a person whose system is at the moment labouring under the poison of cholera, the salt and water is drained off along with what remains of the serum of the blood, and the mucous membranes are injured by having an increased quantity of fluid forced through them. On the other hand, in my practice, if we were too late in employing the remedy, throw in what quantity we chose, the pulse never returned to the wrist; it became powerful—too strong—in the iliacs and carotids; and if we persisted, delirium and fearful irritation soon closed the scene. If reaction has begun, injection is useless—probably injurious.

"If the above conclusions be correct, injection is dangerous, inasmuch as it is no easy matter to catch the proper period; and where it seems to succeed, it is at best doubtful, because a case which will *bear* this stimulus would probably recover without it.

"4thly. What are the immediate effects of injections? By far the most common, in my experience, is drowsiness. The patient falls asleep, unless he vomit; the cramps are very frequently renewed; acute pain (sometimes excruciating) seizes the epigastric region, either during, or soon after the injections. In cases about to terminate favourably, the pulse

pearance of comparative health, was enough to excite in the mind of its early observers the liveliest hopes. These hopes have not been realised; but the evidence before us of the practical results of the saline treatment in London, and in various parts of the country, renders it possible that the practice may be turned to some account, when the limits of its usefulness come to be exactly defined by a very enlarged, and a very considerate experience.

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rises, or returns, after a very few ounces have been thrown in; the colour is partially restored to the cheeks; the temperature is improved, and the distressing sensations relieved. I have almost uniformly seen nearly the same transitory good effect produced by the warm-bath. I am sorry to say that I have in no instance seen the *miraculous* effects described by some of your correspondents: almost all my patients were too drowsy to talk much. I reckon talkativeness, however coherent, a bad symptom; I have always seen it followed by stupor or delirium; it seemed the last flicker of the expiring flame; a proof, in truth, that the organ of thought was morbidly excited. One woman suddenly inquired for her children; a second was grateful, and confident of recovery; a third was inspired with the most gloomy notions of futurity: all these died delirious.

"Such has been my experience of saline, and other injections into the veins. I write under great disappointment, because it is a remedy which I hailed with delight."

The professional intelligence of Dr. Laurie and of Dr. Buchanan is an assurance that the operation of injecting the veins was performed in the best manner.

Before making a trial of injection, a practitioner should be acquainted with the stage of the disease which will justify its use. In the period of collapse—that is, the second stage of acute cholera—he will alone be justified in resorting to the free use of an agent, which, if it do not prove beneficial, will certainly be calculated to do much injury to the patient. In the collapse, the absorbent function of the stomach and bowels is passive, or nearly so; and if the practitioner be unwilling to commit the chance of reaction to the possibility of its being accomplished by the slender resources of the constitution, injection is his last remedial resource. At this time, the quantity of warm saline fluid necessary to force reaction is large, generally between one and two hundred ounces. During the operation, external heat must be assiduously applied to the surface of the body. The return of vomiting and purging should be guarded against, and restrained as far as possible. And in case the patient, after the first course of injection, sink a second time into the collapse, despite of every exertion, the injection must be repeated, and again and again, if the symptoms of collapse continue to recur, until death or permanent reaction determine the issue of the acute disease.

The administration of saline mixtures *by the*

stomach, although partially adopted in the early treatment of cholera, and abandoned and restored at different times during its progress, has again been called into notice.

A solution of culinary salt, it is said, was tried in Russia with great success, and the discovery of this remedy is ascribed to two German physicians, who were then in Petersburg. These physicians treated "thirty patients, of whom they had not lost one. They gave two table-spoonfuls of common table salt in six ounces of hot water at once, and one table-spoonful of a similar mixture, cold, every hour afterwards. *They always begin by bleeding.*" The writers who have reported and bestowed their admiration on this specimen of the success of culinary salt, have not described the character of the cases in which it was used, so as to inform us whether they were merely premonitory, or more or less advanced in the fully-formed disease; nor have these writers admitted the blood-letting—singular to say—to a share of the curative reputation. The strange object to which the salt was applied, seems to have closed their eyes to every contingency. Culinary salt, however, has some claims to be considered, if not a principal, at least an humble auxiliary remedy in the treatment of cholera; and whatever little

credit the persons may deserve who first made known this medicinal quality, it must be awarded to the natives of India, instead of the German physicians. At page 127 of this volume, in the report of surgeon Wilson, common salt is noticed as a remedy to which the natives were very partial in the way of an emetic. The carbonate of magnesia, also, had its virtues put to the test in India; and in Mauritius, the carbonate of potash. But these saline medicines, on a discriminating trial, never could secure the confidence of European practitioners in the East.

Recently, in the hands of Dr. Steevens, the administration of saline remedies by the stomach has been trusted to, almost exclusively in the management of cholera, and his report * states that the

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* "*Observations on the Properties of the Blood.*"—Dr. Steevens *does not expect* the saline treatment will receive *a fair trial* in the hands of practitioners, who believe that fever is a *nervous* impression. I will take the liberty of entering a protest against this singular suspicion, as it cannot possibly apply to any respectable practitioner; and on my own behalf I may safely say, that theoretical speculations never influence my practical conclusions. At present, the Theory of Medicine, like Animal Chemistry, is in too crude a state to support *conviction* in almost any abstruse investigation.

Dr. Steevens says he begins his treatment with a Seidlitz powder, to lessen gastric irritation, and to remove the diseased

practice was extremely successful. The Doctor has given a list of "226 cases," and of these "only 26 were deaths."

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secretions from the intestinal canal. A powder, containing half a drachm of the carbonate of soda, one scruple of the muriate of soda, and seven grains of the chlorate of potass, is dissolved in a tumbler of water, and given soon after the Seidlitz. "In severe cases the above powder was administered every half hour; in those that were less severe, it was used every hour; and in some malignant cases it was used every fifteen minutes. In short, it was given more or less frequently according to the circumstances of the case, and continued until the circulation was fairly restored. It was then given at longer intervals, and when the reaction was completely established, it was left off by degrees.

"When the stomach was irritable, the use of the above powder was occasionally suspended, and common effervescing mixtures, or small doses of the common soda powders, with an excess of the carbonates, were frequently used until the irritation was lessened, and then the carbonate of soda, with larger doses of the chlorate of potass, were generally given without the addition of the muriate of soda, and frequently in such cases the chlorate of potass was given by itself, in doses containing ten grains each.

"A solution of the muriate of soda was also thrown up into the intestines, at as high a temperature as the patients could well bear this saline fluid.

"Seltzer water was allowed *ad libitum*, when the patients expressed a desire for something to drink. A strong infusion of green tea was also occasionally used, in severe cases, apparently with advantage.

"The patients ought not to be allowed to use one particle

Unless professional men, when recording the results of their practice, draw a line between the premonitory symptoms, and the fully-formed

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of solid or indigestible food, for at least five days after they have recovered from the state of collapse.

" Those who put their patients under the saline treatment, ought to trust almost entirely to it; for if they use calomel, brandy, or other destructive agents at the same time, they will do little good; but above all, not one particle of opium ought to be given internally; for, from what I have seen I consider this to be as fatal in cholera as it is in the last stage of either the African typhus, or the seasoning fever of the West Indies. Where the stomach, however, is extremely irritable, about twenty-five or thirty drops of laudanum in a little tepid water, may be injected into the rectum with considerable advantage. When the stomach is very irritable, small quantities of milk with carbonate of soda may be given occasionally; and when we use the saline powders in such cases, they ought be dissolved in a very small portion of water.

" When the case is exceedingly malignant, or when we are called in late in the disease, and find the patient already in collapse, we ought then to have recourse to the most active measures. An ounce of the muriate of soda, with half a drachm of the chlorate, or the muriate of potass, should be given immediately in cold water, and repeated if necessary every half hour, until the patient has taken three doses of this strong solution. Should reaction follow, it may then be kept up by the common saline powders; but should this experiment fail, we may, as a last resource, give the patient another chance for life, by injecting a saline fluid into the veins."

disease, and, again, between the different stages of the latter, no rational knowledge will, or ever can, be generally diffused of the nature of cholera, and the best manner of treating it. In his book Dr. Steevens has not drawn this line—he enumerates every state and stage of the disease as "cases of cholera," and, consequently, the public, being unable to judge for themselves, are led to suppose that his patients would have died to the extent of one half or one third, under any other than the saline treatment. While making these remarks, I do not insinuate in the remotest degree that Dr. Steevens had any intention to deceive; on the contrary, after perusing other and more valuable portions of his treatise, I feel convinced he is an honourable and intelligent physician, and

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Dr. Steevens, and other writers, use such phrases as "severe cases," "malignant cases," and "exceedingly malignant cases." These fanciful distinctions I do not understand. Cholera is composed of *different stages of severity*, that run into each other, and, therefore, are in their essence, equally malignant.

The French have given the name "Cholerine" to "mild cases," in order to distinguish them from the severe. This unscientific division is obviated by including the "mild" under the head of *premonitory cases*, and calling all those in which constitutional disturbance is established, *cholera cases*—for we cannot *a priori* say, that any of the latter will not ultimately produce collapse.

that from the drift of his studies and previous unacquaintance with the peculiarities of cholera, he was induced to form an erroneous estimate of saline medicines in the management of this disease.

Although Dr. Steevens has not drawn the line of distinction himself, his book fortunately affords materials, which enable the qualified reader, to do so with respect to one hundred of the "cures of cholera" in the Cold-Bath-Fields prison. To obviate all suspicion of partiality, I shall quote the words of the author:—"In about fifty of the above cases, the patients were attacked *by a bowel complaint*, and most of them had more or less irritation at the stomach. The fluids that were ejected were *generally deficient in bile*." "The ejections were *less bilious* than in common diarrhœa." "There were also about thirty-one *similar cases* in which the above symptoms were still more distinctly marked, and in many of them, the bowel complaint was, more or less, accompanied by cramp." The whole of these cases, amounting to eighty-one, recovered at the time under the saline treatment; but two had subsequently relapses and they died "before they could again be put under the saline treatment, their stomachs were so irritable." In addition to the preceding, "we had

about nineteen cases in the prison, where the patients were either attacked with the disease, and got into a state of asphyxia in the cold wards during the night, or where the stomach was so irritable in the first stage, that it could not retain the stronger salts. They were treated with the energetic non-purgative saline remedies," and among the nineteen cases only one died.

Now, it evidently appears in this, Dr. Steevens' own statement, that eighty-one out of one hundred of "the cures of cholera," scarcely deserved the name of *premonitory* cases. With diarrhœa, the most serious symptom, and the discharge, containing some bile, they could not be even suspected of being allied to the pestilential cholera, had not indubitable specimens of the disease existed in the neighbourhood. That such cases could not be cured, unless by the saline treatment, is the conclusion and the leading error into which Dr. Steevens has fallen. "They resisted," he says, "opium, chalk, astringents, &c.;" but I can assure Dr. Steevens, that cases of a similar description would yield with the greatest facility to a more appropriate treatment, *although it did not contain one particle of saline medicine.* I have seen scores of mild premonitory cases of cholera rapidly subdued by the administration of an emetic

of ipecacuanha, and an occasional dose of a resinous purgative. It is the dread of giving evacuants, and the desire of directly checking the premonitory symptoms, which has enabled them so often to run into the violent disease. Even after the constitution has become affected, and the fully-formed disease has set in, emetics and vegetable purgatives, with the addition of a little calomel, would be quite sufficient to cure many of the patients. The *artificial* action induced in the stomach and bowels by these agents, appears to supersede the morbid action.

According, then, to Dr. Steevens' own evidence, amongst one hundred attacks in the prison, not more than nineteen were distinct cholera cases, which, with two cases of relapse, make twenty-one for the sum total—of these, three died. Consequently, the comparative mortality was one in seven of the cholera cases, instead of three in one hundred, as it was at first represented to be. The mortality of one in seven is still a considerable reduction; but we should not forget that the prison was a very favourable place to obtain the patients early in the attack. A medical attendant resided in the building, and the inmates, of course, were all at his door.

When attempting to elucidate the medical

management of cholera, it is only by treating of the remedies in connection with the different periods of the disease, that we can ever convey any solid instruction. At the same time, a few general facts, derived from the most ample experience, should be kept steadily before the mind. One of these general facts is, that many patients in the apparently worst, as well as the mildest attacks, may recover without having received the slightest medical aid; and that many patients may recover not only despite of the disease, but despite of very injudicious treatment. In the sphere of my own experience and practical observation, which have certainly been somewhat considerable, I have witnessed the pernicious effects of medicines which had an ephemeral notoriety, as bismuth, cajeput oil, and tobacco; and I have seen the negative evils which attend the inhalation of oxygen gas, &c. Of all the modes of treatment, however, that which consists in the copious administration of brandy and laudanum, (though so highly praised by some, and extensively circulated,) has been the least suited to the treatment of cholera in Europe. I am inclined to believe, had the disease been left to its own course in the localities where the copious use of brandy and

laudanum was resorted to for its cure, that the mortality would not have been greater.

As a proportion of the patients will recover under the various plans of treatment, the practitioner should adopt that remedial course which is most successful. I have tried the powers of common salt and the alkaline carbonates, and found them frequently useful, and never, under proper caution, injurious, but I could not depend upon them alone, even for the recovery of all the *premonitory* cases; nor are they, by any means, essential even as auxiliaries, as will be seen in the practice adopted at Hetton, and in the detail of the illustrative cases. The time in which the saline remedies, and those more particularly of the non-purgative character, may prove of peculiar advantage, is probably, in the period of transition, when the acute symptoms are passing into the chronic. The returning vitality may, then, favour their absorption in the stomach, and, as a consequence, the thickened blood may regain the more rapidly its serous consistence. In the fever, moreover, if the secretions are suppressed, and the blood deficient in its saline ingredients, their use may assist in removing these symptoms.

In closing my remarks on the character and

the treatment of cholera in England, I will again observe, that it may remain in the memory of the reader—there is not any dangerous disease known to medicine, which is more curable than cholera, provided proper treatment be resorted to *before* the first stage of the acute period is far advanced. While the volume of the pulse remains undiminished, and the skin warm, or while the temperature of the skin and volume of the pulse are little below the natural standard, the remedies which I have ventured to recommend, will, when judiciously administered, prove uniformly successful, or, at least, so rarely will they be resisted, that I would ascribe their failure in such an instance, to some peculiarity in the constitution of the patient, distinct from the cholera symptoms, or to something of unusual occurrence in the circumstances of the patient.

As the symptoms continue to advance in the first stage, producing a more marked diminution in the volume of the pulse, and in the temperature of the surface of the body, the chances of effecting recovery are less strong; but, until the near approach of the termination of this stage, a perseverance in the remedial measures will succeed in a large proportion of cases—particularly amongst

children and young persons of either sex—if blood-letting can be performed.*

In the second stage of acute cholera, the pulse, at the wrist, is nearly, or it is completely extinct—the body is deadly cold—the stomach and bowels have lost their irritability, and scarcely any benefit can be expected from the use of the ordinary internal medicine. The propriety of injecting the veins may then be entertained; or the patient, under the steady application of external heat, may be entrusted to the chance of the constitutional resources bringing about reaction. Should reaction begin to come round, the medical treatment must be cautiously regulated, both during the transition, and the consecutive fever.

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* At this period of the disease, surgeons often fail in procuring blood—their incision in the vein being too small to admit the somewhat thickened blood to flow. The incision should be free, and if any difficulty be afterwards experienced, a second vein should be immediately opened. Many practitioners confound the latter part of this, the *first* stage of acute cholera, with the collapse or second stage, and consequently claim the reputation of performing extraordinary cures.

APPENDIX.

APPENDIX.

General Summary of the Symptoms of the Cholera in India, with the Irregularities in particular Symptoms, abridged from the Madras Report, edited by Mr. Scot.—Recovery, Sequelæ, and Appearances on Dissection, in India.—Plain Directions for the Analysis of the Blood and Alvine Evacuations, in Cholera.

Summary of the Symptoms.—The invasion of cholera generally takes place in the night, or towards morning. The patient is sick at stomach; he vomits its contents, and his bowels are at the same time evacuated. This evacuation is of a nature quite peculiar to the disease; the entire intestinal tube seems to be at once emptied of the fœcal or solid matters, and an indescribable, but most subduing, feeling of exhaustion, sinking and emptiness, is produced. Faintness supervenes, the skin becomes cold, and there is frequently giddiness and ringing in the ears. The powers of locomotion are generally soon arrested; spasmodic contractions, or twitchings, of the muscles of the fingers and toes, are felt; and these affections gradually extend along the limbs to the trunk of the body. They partake both of the clonic and tonic spasm, but the clonic form chiefly prevails. The pulse, from the first, is small, weak, and accelerated; and after a certain interval, but especially on the accession of spasms, or of severe vomiting, it sinks suddenly, so as to be speedily lost in all the external parts. The skin, which from the commencement of the disease is below the natural temperature, becomes colder and colder. It is very rarely dry; generally covered with a profuse cold sweat, or with a clammy moisture. In Europeans, it often partially assumes a livid hue, the whole surface appears collapsed, the lips become blue, the nails present a similar tint, and the skin of the feet and hands becomes much corrugated, and exhibits a sodden appearance. In this state the skin is insensible, even to the action of chemical agents, yet the patient generally complains of oppressive heat on the surface, and wishes to throw off the bed-clothes. The eyes sink in their orbits, which are surrounded by a livid circle; the corneæ become

flaccid; the conjunctiva is frequently suffused with blood; the features of the face collapse, and the whole countenance assumes a cadaverous aspect, strikingly characteristic of the disease. There is almost always urgent thirst, and desire for cold drinks, although the mouth be not usually parched. The tongue is moist, whitish, and cold. A distressing sense of pain, and of burning heat at the epigastrium, are common. Little or no urine, bile, or saliva, is secreted. The voice becomes feeble, hollow, and unnatural. The respiration is oppressed, generally slow, and the breath is deficient in heat.

During the progress of these symptoms, the alimentary canal is very variously affected. After the first discharges by vomiting and purging, however severe these symptoms may be, the matter evacuated is always watery, and in a great proportion of cases it is colourless, inodorous, and often homogeneous. In some it is turbid, resembling muddy water; in others it is of a yellowish or greenish hue. A very common appearance is that which has been emphatically called the "rice-water stools," an appearance produced by flaky matter floating in the watery or serous part of the evacuation. The discharges from the stomach, and those from the bowels, do not appear to differ, except in the former being mixed with the ingesta. Neither the vomiting nor the purging are symptoms of long continuance. They are either obviated by art, or the body becomes unable to perform these violent actions: and they, together with the spasms, generally disappear a considerable time before death. If blood be drawn, it is always dark, or almost black, very thick, ropy, and generally of slow and difficult effusion. Towards the close of the attack, jactitation comes on, with evident internal anxiety and distress, and death takes place, often in ten or twelve, generally within eighteen or twenty hours, from the commencement of the attack.

During all this mortal struggle and commotion in the body, the mind remains clear, and its functions undisturbed, almost to the last moment of existence. The patient—though sunk and overwhelmed, listless, averse to speak, and impatient of disturbance—still retains the power of thinking, and of expressing his thoughts, as long as his organs are obedient to his will. Such is the most ordinary course of cholera asphyxia, when its tendency to death is not checked by art.

A favourable issue is denoted by a rising of the pulse, a return of heat to the surface, inclination to natural sleep, and a diminution or cessation of vomiting, purging and spasms; these indications being succeeded, after an interval, by the re-appearance of fœcal matter in the stools, of bile, of urine, and of saliva.

Irregularities in Particular Symptoms.

Vomiting is a prominent symptom of cholera; but there are numerous instances on record, where it has been entirely absent. In some cases, the stomach appears to be freely and perfectly emptied, prodigious quantities of watery fluid being ejected occasionally with great force. This fluid sometimes resembles what is discharged in pyrosis; at times it is glairy and ropy. In other cases, the stomach seems to have lost the power of freely ejecting its contents; there is an ineffectual straining to vomit, and a spouting up of any fluid which is swallowed, as if by an effort of the lower part of the œsophagus, rather than of the stomach itself. When full vomiting in these cases has been effected by medicine, relief follows; not, however, in all probability, by the mere evacuation of the gastric contents, but as a consequence of that change of the condition of the patient which must necessarily be established before the stomach can resume the action of vomiting. Vomiting is sometimes altogether absent; or, if it has been present, soon ceases, from an atonic state of the stomach, under which that organ receives and retains whatever may be poured into it, as if it were really a dead substance. This is a most alarming state, in comparison with the utmost irritability, as almost any other imaginable condition of the part may be held to be of little danger.

Purging is a more constant symptom of cholera than vomiting, and in a majority of cases it is the first in the order of occurrence; but being a less striking deviation from a state of health than vomiting, which instantly arrests the attention, it has usually been treated of in succession to it. This symptom has very rarely been altogether absent; but there seems no reason to doubt that this is sometimes the case. Its absence appears indeed to denote a peculiar degree of malignancy in the attack. The accounts given by the patients, however, in respect to their alvine evacuations, are not to be implicitly believed. Their attention is not always drawn to the nature of the discharge, and they are apt to convey very erroneous notions on the subject to the medical attendant. In cases where little or no purging has taken place during life, the intestines have yet been found after death to be filled with the rice-water fluid, as if they had wanted energy to throw it off, or as if a stricture had been formed on the lower portions of the gut. The intestinal canal appears to be subject indeed to the same influences, and its contents appear to vary, as has been stated to be the case

with the stomach; with this exception, that it seems always to have the power of emptying itself of its *natural* contents, at the commencement or during the progress of the disorder. This inference is drawn from the accounts of dissections, for we find no instance recorded of fœces remaining, unless in very protracted cases, when the primary disease has been overcome. The ejections are sometimes made without effort or uneasiness; at others they are thrown out with great force, which has been compared to the squirt of a syringe. They also sometimes take place simultaneously with vomiting, spasm, and stoppage of the pulse, as if all these affections originated at the instant, from one common cause. There is seldom much griping or tenesmus, although the calls are very sudden, and are irresistible. Pain on pressure of the abdomen, is only occasionally noticed. In advanced stages of the disease, purging generally ceases; but in many cases a flow of watery fluid from the rectum takes place on any change of position. The matters evacuated after the first emptying of the bowels, have been occasionally observed to be greenish, or yellowish, turbid, or of a frothy appearance, like yeast; but by far the most common appearance is that of a pure serum, so thin and colourless, as not to leave a stain on the patient's linen. The next in order of frequency, is the rice-water fluid. The re-appearance of fœcal matter, especially if tinged with bile, seldom, perhaps never, takes place till the disease has been subdued.

Spasm has been held to be so essential a feature of that species of cholera of which we are treating, as to confer on it a specific name. In so far, however, as relates to the muscles of voluntary motion—and it is that description of spasm only which we mean here to treat of—no symptom is more frequently wanting. Spasms of the muscles chiefly accompany those cases in which there is a sensible and violent commotion in the system. Hence they are more frequently found in European than in native patients, and in the robust of either, than in the weakly. In the low and most dangerous form of cholera, whether in European or native cases, spasm is generally wanting, or is present in a very slight degree. The muscles most commonly affected are those of the toes and feet, and calves of the legs; next to them, the corresponding muscles of the superior extremities; then those of the thighs and arms; and, lastly, those of the trunk—producing various distressing sensations to the patient. Among these, hiccough is not unfrequent; but it has been observed, that this symptom in cholera is not at all indicative of danger. The muscles of the eye-balls have not been observed to be affected with spasm, unless the sinking of these

organs in their orbits may be considered to be an effect of it. The reports make frequent mention of a remarkable permanent contraction of the muscles of the abdomen, by which the belly is drawn towards the spine. The spasms attending cholera are of a mixed nature, not strictly clonic; the relaxations being less prompt and frequent than in epilepsy or convulsion, and seldom durable, as in tetanus. The contractions of the muscles are invariably attended with pain; and some medical officers have observed, that a degree of spasmodic stiffness has continued for several days afterwards. It has also been remarked, that spasmodic twitchings of the muscles have taken place after death, and have continued for a considerable time. In one case, where a man had been paralytic in his limbs, with a total numbness of them, they were severely affected with spasms, and became exquisitely sensible.

Urine.—In cholera, the secretion of urine, like all the other natural secretions, appears to be very generally suspended. When this secretion is not suspended during an attack of cholera, the urine is almost always limpid and clear, though very small in quantity.

It has been remarked, that the cases in which urine appeared to be secreted, were not less dangerous than those where this secretion was entirely suspended; but it is much more generally observed, that the appearance of urine, especially when this is the result of *restored* secretion, is always a most favourable omen. In many cases, the secretion of urine has not been restored before a period of fifty hours had elapsed from the commencement of the attack.

Thirst and Sense of Heat in the Epigastrium.—Thirst and sense of heat or burning in the region of the stomach, are generally connected together, and form very prominent and constant symptoms of cholera. Yet these symptoms have often been altogether wanting. Even when they are present in the highest degree, the mouth is not often parched, nor the tongue often dry: on the contrary, there seems, in general, no want of moisture; and while all is burning within, these surfaces are cold and blanched.

Skin.—The state of the skin in cholera is, in general, what we might expect to find it in patients labouring under such affections of the alimentary canal, and with the subdued circulation which takes place in that disease. It is cold, generally clammy, and often covered with profuse cold sweats.

Nevertheless, varieties occur in this, as in the other symptoms of cholera. The skin is sometimes observed to be dry, though cold; and sometimes of natural—nay, in some rare instances, of preternatural warmth. An increase of temperature has been repeatedly observed to take place just before death; but the developement of heat appears to be confined to the trunk and head; and, in almost all cases, this *partial* developement of heat is found to be a fatal symptom. It is entirely unconnected with any restoration of the energy of the arterial system, or any improvements in the function of respiration. The heat, in such instances, has been observed to continue considerable for some hours after death.

The sensation imparted by touching the skin of a person ill with cholera, is very peculiar, and reminds one of that imparted by a dead body. The skin, when much collapsed, becomes insensible even to the action of chemical agents; and hence the usual vesicatories fail in producing any effect. The application of mineral acids and of boiling water, in this condition of the skin, produces little or no effect; and some patients are said not to have been sensible to the operation.

At a very early stage in cholera, leeches can procure little or no blood from the skin. When the sweat is thin, it is usually poured out, in large quantity, from the whole surface of the body; but when thick or clammy, it is more partial, and generally confined to the trunk and head.

Countenance.—That remarkable shrinking of the features of the face, which has acquired the emphatic term of "the true cholera countenance," appears in every case not quickly cut short by medicine; but the degree in which this symptom may be present will be differently estimated, according to the natural contour of the patient's features. This expression of countenance, which conveys too truly that of death itself, cannot be mistaken; and, by an attentive observation, it will be perceived that a similar shrinking takes place throughout the limbs and all projecting parts of the body. The eyes become dim, the corneæ flaccid, and covered with a film. The abdomen has sometimes been observed to be tumid, but more frequently drawn towards the spine. The general apparent reduction of bulk cannot, however, be considered as proportionate to the volume of fluids thrown out, nor, indeed, to depend essentially on that circumstance, as it occurs equally under the most moderate discharges.

Respiration.—Respiration is not usually interrupted in the early stages of cholera, unless from a peculiarity in the mode of

attack, under which spasm seizes the muscles subservient to that function. In many cases terminating in death, respiration has gone on, in its mechanical part, with little or no interruption, except that it became slower and slower; and an instance has been recorded, where this function was performed only seven times in the minute. Numerous cases, on the other hand, are noticed, especially in Europeans, where the interruption of respiration was most distressing, and could only be compared to the most violent attacks of asthma. Although the breath is stated in many of the reports to have been deficient in heat, it is not clear that this was a general symptom; nor is it understood that this coldness was more particularly observed in cases of difficult and laborious respiration, than in those where the function seemed to be performed without interruption—at least, mechanically.

The voice, in general, partakes of the debility prevailing in other functions, and it is usually noticed as being feeble, often almost inaudible. Yet instances are not wanting, where the voice has continued of natural strength almost to the last moment.

Jactitation.—When much restlessness prevails, it is probably connected with some great oppression of particular organs; and though the absence of this symptom is not, in itself, to be depended on as affording grounds for a favourable prognosis, its presence is always highly alarming.

Functions of the Sensorium.—In a disease so highly congestive as cholera, where vertigo, deafness, ringing in the ears, often prevail, and where very large quantities of opium and intoxicating matters may have been swallowed, it is truly surprising that the functions of the sensorium are so very rarely disturbed. It seems probable, that it is in many instances from an inaccuracy of language, that coma has been represented as a symptom of cholera; for we find that a patient who has just been represented to be in a *comatose* state, can with more or less facility be roused from it; and, though he cannot overcome that retirement within himself which constitutes so remarkable a feature of the disease, he will yet evince, by the clearness and precision of his answers, that his intellect is not destroyed. Coma must, however, be admitted occasionally to occur, especially towards the termination of the case, when it is fatal; but delirium has seldom or never been observed, unless among the sequelæ of cholera, when other and foreign morbid actions have been established. That degree of incoherence which has accompanied the excessive spasmodic affections of the muscles,

or which has followed the free use of opium and spirits, is not considered an exception to this remark.

Syncope is not a common symptom in cholera, and when it has occurred, unless after venesection, it has generally been on the invasion of the disease. During the progress of this disorder, when the nervous energy seems to be almost annihilated, and the functions of the heart and arteries to be abolished, this symptom is yet very rarely observed. Deafness has been remarked, in some instances, to have been completely established before any other symptom of the disease had developed itself, the patient continuing some time to pursue his ordinary employment.

Pulse.*—Of all the symptoms of cholera, none is so invariably present—none, indeed, so truly essential and diagnostic—as the rapid sinking of the circulation. It must, nevertheless, be admitted, that, where instant remedial measures have been successfully practised, this symptom may not have developed itself; and that there are even cases where an excited vascular action has been observed to accompany the first movements of the system in cholera.—The period at which a marked diminution of vascular action takes place, is somewhat various. The pulse sometimes keeps up tolerably for several hours, though very rarely. It more generally becomes small and accelerated at an early stage, and, on the accession of spasm or vomiting, suddenly ceases to be distinguishable in the extremities. The length of time during which a patient will sometimes live in a pulseless state, is extraordinary. Dr. Kellett relates a case where the pulse was gone within three hours from the attack; yet the man lived in that state from the 3rd of October, at four, P. M., till the 6th, at two, P. M. On the cessation of the spasm or vomiting, and sometimes, apparently, from the exhibition of remedies, the pulse will return to the extremities for a short time, and again it will cease. The superficial

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* The animal functions appear, in general, to have been early impaired, and the prostration of strength to have preceded most of the other symptoms; but instances are not wanting of patients being able to walk, and to perform many of their usual avocations, even after the circulation has been so much arrested that the pulse has not been discernible at the wrist. Much seems to depend on the constitutional strength and firmness of mind in the patient, and on the form in which the disease has made its attack. The cases here alluded to are those chiefly in which it has begun by an insidious watery purging; and many lives have been lost in consequence of the patients under these fallacious appearances not taking timely alarm, and applying for aid.

veins and arteries are not always collapsed, even when the pulse has ceased. If these vessels be opened in this condition, the contained blood flows out; their walls then collapse, and no more blood can be extracted. There is no authenticated fatal instance of cholera on record, where the circulation has not been arrested, in the extremities at least, long before death took place.

State of the Blood.—With the decline of the pulse, the blood becomes of an unnaturally dark colour and thick consistence. These appearances are very uniformly expressed by the terms dark, black, tarry, in regard to colour; and by thick, ropy, syrupy, semi-coagulated, in respect to consistence. The change in the condition of the blood is likewise fully proved to be in the ratio of the duration of the disease; the blood at the commencement seeming to be nearly, or altogether natural, and more or less rapidly assuming a morbid state as the disease advances. The blood drawn from patients suffering from cholera, is stated to be generally very destitute of serum, and never to exhibit the appearance of buff. A great majority of the reports state, unequivocally, that after a certain quantity of dark and thick blood has been abstracted from a patient under cholera, it is usual for its colour to become lighter, its consistence to become less thick, and for the circulation to revive; such appearances always affording grounds for a proportionably favourable prognosis. In many instances, however, no such changes have been observed to accompany the operation of bleeding, while yet the result was favourable. The blood has been occasionally found to be of as dark a colour in the left as in the right side of the heart, affording reason to believe that, in the whole arterial system, it was equally changed. The temporal artery having been frequently opened, the blood was found to be dark and thick, like the venous blood; but it would appear that this operation has not been performed in general, until the attempts to procure blood from the brachial or jugular veins had failed; little or no blood could be obtained, the artery merely emptying itself in a languid stream, not in a jet, and then collapsing. When reaction has been established, the blood occasionally shews the buffy coat.

Recovery.—When medical aid is early administered, and when the constitution is otherwise healthy, the recovery from an attack of cholera is so wonderfully rapid, as perhaps to be decisive of the disease being essentially unconnected with any organic lesion. In natives of this country, especially, in whom there is ordinarily very little tendency to inflammatory action, the recovery from

cholera is generally so speedy and perfect, that it can only be compared to recovery from syncope, cholic, and diseases of a similar nature; but in Europeans, in whom there is a much greater tendency to inflammation, and to determinations to some of the viscera, the recovery from cholera is by no means so sudden or so perfect. On the contrary, it is too often involved with affections as various as the diseases of these viscera are known to be in this climate. The most frequent of the sequelæ of cholera are, affections of the intestines, of the brain, of the liver, and of the stomach. When cholera, however, is of long continuance, and when the congestion appears to be thoroughly established, few, either Europeans or natives, who outlive the attack, are restored to health without considerable difficulty.

It has been already remarked, that recovery from an attack of cholera is indicated by the return of heat to the surface of the body, and the rising of the pulse. A deceitful calm, however, sometimes attends these favourable appearances, which too often mocks our hopes and expectations. When the disease is characterised by violent morbid actions, the diminution or cessation of these, however sudden, may generally be regarded as the usual mode in which nature conducts the patient to recovery; but in what may be termed negative symptoms, the steps to recovery are extremely dark and obscure; the evolution of natural heat, and arterial action, have occasionally been noticed as amongst the last of the functions which are restored. Patients have been observed to remain for one, two, and even three days, in a state of the greatest collapse, and yet, contrary to all expectations, have recovered.

Sequelæ.—*(Abridged from the Bengal Report.)*—In the more violent forms of the disease, even amongst natives, recovery was protracted. After the most distressing symptoms had been in a great measure subdued, the patient was still harassed by constant thirst, irritability of stomach, pain and soreness of the epigastric region, watchfulness, and confused dreams. The stomach and bowels did not for a long time regain their usual tone; and the frequent occurrence of obstinate dysentery or diarrhœa proved, that almost irreparable mischief had been done to the whole of the chylopœtic viscera. In these cases the debility was great, and of long duration; and the strictest attention was required during many days, to prevent the patient from sinking entirely.

It was almost uniformly observed, that health was soonest restored in those cases in which feculent black and acrid motions were early procured; and, on the other hand, their absence was almost uniformly marked by feverishness, sour eructations, flatu-

lence, constipation, and other signs of want of tone and sluggish action of the hepatic system. Fevers of the remittent and intermittent type were among the most frequent sequelæ of the disorder; but among natives, and especially those of weakly frame, they could not be considered to form an essential part of the attack. They were hardly ever immediately superinduced upon the collapsed stage, and seemed rather an incidental affection in bodies much predisposed to take on new forms of disease by great existing debility.

When the disease ran its full course with Europeans, and with natives of robust athletic make, the following appearances generally presented themselves. What may be termed the cold stage, or state of collapse, usually lasted from twenty-four to forty-eight hours, and was seldom of more than three complete days' duration. Throughout the first twenty-four hours, nearly all the symptoms of deadly oppression, the cold skin, and oozing of clammy sweat from every pore, the feeble pulse, occasional vomiting, purging and cramp, the thirst and anguish, continued undiminished. Then the system shewed signs of revival, the vital powers began to rally, the circulation and heat to be restored, and the spasms, sickness, and desire to go to stool, to be considerably lessened. The warmth gradually returned, the pulse rose in strength and fulness, and then became sharp, and sometimes hard: the tongue got more deeply furred, the thirst continued with less nausea, the stools were no longer like gruel or rice-water; they, usually between the third and sixth day, became first brown and watery, then dark green, black and pitchy, and the bowels during many days continued to discharge immense loads of vitiated bile, until, with returning health, the secretions of the liver and other viscera gradually put on a natural appearance. It was remarked, that where the motions consisted of a chocolate-coloured fluid, with flocculi swimming in it, the patient rarely recovered.

The fever, which almost invariably attended this stage of the disease, partook much of the nature of the common bilious attacks of those latitudes. There was the hot dry skin, the foul, deeply-furred, dry tongue, parched mouth, thirst, sick stomach, depraved secretions, restlessness, watchfulness, and the quick variable pulse, sometimes with delirium, stupor, and other marked affections of the brain.

Generally, when the disorder proved fatal, after reaching this stage, the tongue, from being cream-coloured, got brown, and sometimes black, hard, and more deeply furred; the teeth and lips were covered with sordes; the state of the skin varied, chills alternately with heats; the pulse became extremely weak and

tremulous; the hiccough, catching of the breath, great restlessness, and deep moanings, succeeded; and the patient soon sank, incoherent and insensible, under the debilitating effects of low nervous fever, and frequent dark, tarry, alvine discharges.

Appearances on Dissection.—(*Abridged from the Madras Report.*)—The external appearance of European subjects, who have sunk under cholera, closely resembles that which has been noticed as taking place during life. The surface is livid, the solids are shrunk, the skin of the hands and feet is corrugated. There seems no sufficient evidence of any uncommon tendency in the body to putrefaction after death, nor of any characteristic fœtor from the abdominal cavity. No particular morbid appearances have been found in any of the cavities of the body which are lined with *serous* membranes, or in these membranes themselves. The cavities of the pleura, of the pericardium, and of the peritoneum, have almost uniformly been found in a natural state, or the deviations from that state have manifestly had no connexion with cholera. The surfaces which are lined or covered with *mucous membranes*, have, on the contrary, very generally exhibited signs of disease. These will be noticed as the organs connected with them come to be mentioned.

The lungs have not unfrequently been found in a natural state, even in cases where much oppression had existed previously to death. Much more generally, however, they have been found either to be gorged with dark blood, so that they have lost their characteristic appearance, and have assumed more that of liver or spleen, or they have been found to be in the opposite state—that is, collapsed into an extremely small bulk, and lying in the hollow on each side of the spine, leaving the cavity of the thorax nearly empty. The blood found in the lungs has been always very black. The heart and its larger vessels have been found to be distended with blood, but not so generally as the apparent feebleness of their propelling power, and the evident retreat of the blood to the centre, would have led us to expect. The right auricle and ventricle being gorged with blood, is nothing peculiar to cholera; but some dissections have shewn the left cavities to be filled even with dark or black blood, which we may reckon as a morbid appearance more peculiar to it. In the abdominal cavity, the peritoneal coverings of the viscera, being *serous membranes*, present, in general, but little deviation from the healthy state; occasionally, indeed, the morbid accumulation of blood in the vessels of the viscera, imparts an appearance of turgidity and blueness, which is evident on their exterior surfaces. We also find them bearing

marks of inflammation, especially where the patient may have lingered long before death. In other cases, the whole tube has had a blanched appearance, both externally and internally. The stomach and intestines generally preserve their ordinary volume. The appearance of the omentum is not sensibly affected in cholera. The stomach is found to be so variously affected, as to destroy all grounds for pathological reasoning. It is very rarely found empty or much contracted after death, nor has any appearance of spastic stricture of the pylorus been often detected: it has, however, sometimes occurred. Its contents appear to be chiefly the ingesta in an unaltered state. In some cases, greenish or yellow, or turbid matters are found. Various appearances, either of active inflammation, or a congested state of the vessels, have been noticed, sometimes in one part, and sometimes in another. The parts, however, exhibit so great a variety of appearances, from a perfectly natural state to the most morbid, that no particular light is thrown by them on the disease.

The intestinal tube is sometimes collapsed, but oftener found to be more or less filled with air, distended in some parts into bags or pouches, containing whitish, turbid, dark, or green-coloured fluid; and in others, presenting the appearance of spastic constriction. The latter, however, is not common. No fœcal or other solid matters are found in the intestines; but very commonly large quantities of the rice-water, of turbid or of serous fluid. The duodenum, and occasionally the jejunum, have been found loaded with an adherent whitish or greenish matter, like mucus; at other times, they have been found seemingly denuded, and often perfectly healthy. Traces of bile in the intestines, or of any substance apparently descended from the stomach, are exceedingly rare. Sanguineous congestion, and even active inflammation, are stated to be more common in the bowels than in the stomach; but, on the other hand, instances are very numerous where no such indications have been detected. The thoracic duct is stated to have been empty of chyle. The liver has been commonly found to be gorged with blood, but not always. It is an organ usually very vascular, and it would probably demand a nicer discrimination than has been bestowed on the subject, to distinguish the degree of congestion in which it is naturally left by the settling of the blood after death, in ordinary diseases, from that which has been observed after an attack of cholera. The gall-bladder has, almost universally, been found to contain bile, and in the great majority of cases even to be completely filled with it. As is usual with

this secretion in cases of retention, it is of a dark colour. Very different states of the gall-ducts have been described; cases of constriction and impermeability seeming to be equally numerous with those of an opposite character.

The urinary bladder is found, we may say, almost universally without urine, and very much contracted. The lining or mucous membranes of the bladder and ureters have been found coated with a whitish mucous-looking fluid. The appearance of the spleen, which is so various under the ordinary conditions of the body after death, has indicated nothing that can be mentioned as belonging to cholera. The vessels of the mesentery have been very generally found to be uncommonly full of blood.

In the head, appearances of congestion, and even of extravasation, have been frequently observed, but not so uniformly, or to such an extent, as to require any particular notice. Only one case has been given, where the state of the spinal marrow was examined.

From this general view of the appearances found on dissection of the bodies of persons who have died of cholera, it is manifest that the information thence derived, is, in a pathological point of view, of a negative nature only. It is, nevertheless, of consequence in a practical sense, especially in treating the sequelæ of cholera.

PLAIN DIRECTIONS FOR THE ANALYSIS OF THE BLOOD AND ALVINE EVACUATIONS, IN CHOLERA.

(Extracted from Dr. O'Shaughnessy's *Report on the Chemical Pathology of the Malignant Cholera.)*

"The principal objects in prosecuting the analysis of these fluids are, 1. To ascertain the quantity of water in the blood; 2. The quantity of saline matters in that fluid; and, 3. The presence or absence of the principles of blood in the alvine dejections.

"To accomplish the first, a very simple plan is sufficient. Take 1000 grs. of the serum or blood to be examined, place it in a common bowl, resting on a saucepan containing water; place the saucepan on an ordinary fire, covering the bowl with a piece of gauze. Continue the boiling until a bit of mirror glass is not dimmed by being held over the bowl. The water is thus expelled, and its amount ascertained by weighing the residuum. According

to LECANU's analysis, *blood* contains from 780 to 785 parts of water per 1000; *serum*, from 900 to 906. These estimations may be taken as the standard of comparison between the normal blood, and that drawn from the cholera patient. The quantity of salts is best ascertained by drying the blood or serum completely in the water bath now described, and incinerating the residuum, in small portions at a time, on a little tray made of folded platinum foil. A spirit-lamp is the best mode of applying the necessary heat, and the substance should be kept at a red heat until it ceases to be black on cooling.

"The normal quantity of salts in the human blood, is from 11 to 12 grains per 1000.

"It is unnecessary to enter into a qualitative examination of the saline mass thus obtained. It is only essential to touch it with a little moistened turmeric test paper, or with litmus paper previously reddened by an acid, in order to find if any alkaline carbonate be present. A red stain on the turmeric, and a blue on the litmus test papers, sufficiently prove the presence of the alkalies or their carbonates.

"*The alvine dejections* may be simply examined by the immersion of these test papers—by the boiling of their fluid parts in a Florence flask, and the addition of the prussiate of potash. The evidence of alkalescence with the former, and coagulation by either of the latter, is sufficient to show their nature."

Those who desire further experimental details, may consult the processes described for the examination of the saline parts of the blood in the original Report.

FINIS.

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